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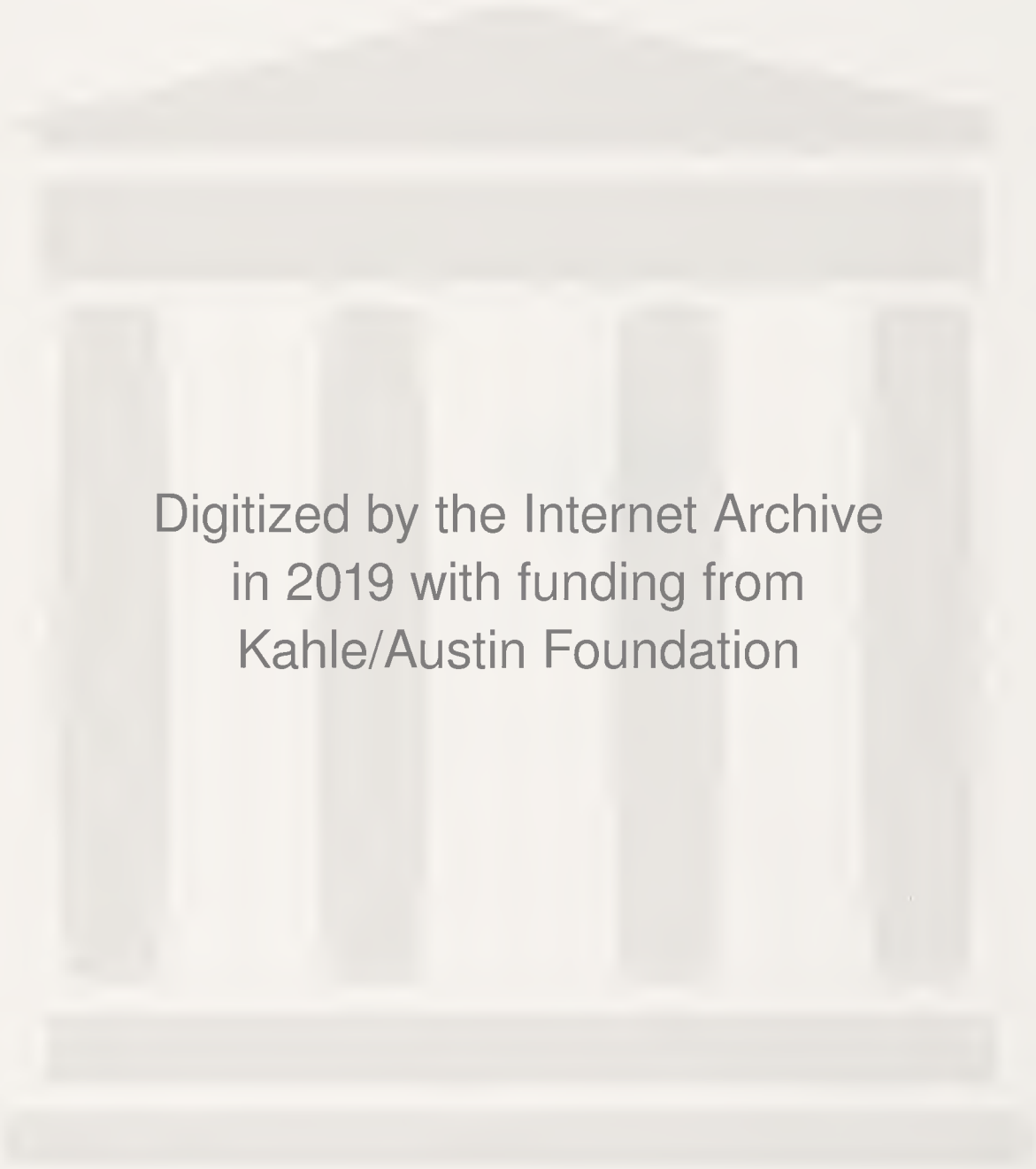
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ANTARCTIC BIBLIOGRAPHY

Volume 16

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Introduction

This volume is the sixteenth in a continuing series of compilations presenting abstracts and indexes of current Antarctic literature published since 1962. A companion volume to the series, *Antarctic Bibliography, 1951-1961,* extends the coverage retrospectively.

The material has been compiled over a period of eighteen months; the cut-off date for inclusion in this volume was June 1988. To provide current awareness, the abstracts have also been distributed as monthly bulletins under the title *Current Antarctic Literature.* The bulletins are generated from a computerized data base which is also used in producing this cumulated listing and the indexes.

The present volume contains abstracts numbered from 34,661 to 37,522; these first appeared in issues no. 173 through 190 of *Current Antarctic Literature.* The first five volumes each contained 2,000 abstracts. Thus, items 1–2,000 appeared in volume 1 (published in 1965), items 2,001–4,000 in volume 2 (1966), items 4,001–6,000 in volume 3 (1968), items 6,001–8,000 in volume 4 (1970), and items 8,001–10,000 in volume 5 (1971). Volume 6 (1973) contained items 10,001–12,244, volume 7 (1974) items 12,245–14,447, volume 8 (1976) items 14,448–16,899, volume 9 (1977) items 16,900–19,248, volume 10 (1979) items 19,249–21,721, volume 11 (1980) items 21,722–24,083, volume 12 (1982) items 24,084–26,452, volume 13 (1983) items 24,453–28,961, volume 14 (1985) items 28,962–31,756, and volume 15 (1986) items 31,757–34,660.

The material is arranged in sections representing thirteen subject categories (see table of contents). Items that apply to two or more categories are listed in one section only and cross referenced at the end of the other pertinent sections. Because of this scheme of arrangement, some items dealing with the same subject (from different aspects) will be found in two different categories; e.g. some papers on marine sediments may be found in Section E, Geological Sciences, and others in J, Oceanography. Within each section, abstracts are arranged by accession number; the indexes are keyed to these numbers.

Foreign-language titles are given in English translation first, with the original title following in brackets. Transliteration of Cyrillic and romanization of oriental languages follow the Library of Congress systems. Some of the citations are followed by library call numbers, preceded by the library symbols commonly used in union catalogs.

As a rule, the abstracts are informative rather than descriptive, but no attempt is made to verify or critically evaluate the author's statements or conclusions. Author abstracts are either used unchanged or modified for the sake of brevity or conformity to guidelines adopted for this bibliography.

Four indexes are provided: (1) an author index that includes coauthors (anonymous journal articles are referred to under the journal name); (2) a subject index that occasionally extends to two levels of subheadings and contains cross-references; (3) a geographic index to names of places, stations, and geographic features as approved by the U.S. Board on Geographic Names; and (4) a grantee index to names of organizations or institutions that received financial support from the National Science Foundation for work that resulted in publications abstracted in the volume. In each index, entries are cited by a letter, indicating the subject category, followed by the accession number: for example, B–34764 refers to section B, Biological Sciences, item number 34764.

Although the majority of the publications abstracted are in the collections of the Library of Congress, many significant items were lent by or exchanged with other institutions, made available by the Division of Polar Programs of the National Science Foundation, or received as review copies or reprints directly from publishers and

authors. Because they contribute to more current and complete coverage, review copies and reprints are especially valuable, and publishers and authors are encouraged to send them to the Library of Congress, Science and Technology Division, Cold Regions Bibliography Project, Washington, D.C. 20540. U.S.A.

Requests for photoreproductions of documents cited in this bibliography, except material protected by copyright, should be directed to the Library of Congress, Photoduplication Service, Dept. C–177, 10 First Street SE., Washington, D.C. 20540. U.S. government or government-sponsored technical reports may, in most cases, be obtained from the National Technical Information Service, Springfield, Va. 22151. For such reports, NTIS order numbers are usually included in the bibliographic citation.

Geza T. Thuronyi, *Head*
Cold Regions Bibliography Project
Science and Technology Division
Library of Congress

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A. GENERAL

A-34734

Parfit, M., **South light: a journey to the last continent,** New York, Macmillan, 1985, 306p.

DLC G850 1983 .P36A36 1985

This is the account of a journalist's journey through parts of Antarctica with a group sponsored by the U.S. National Science Foundation, and his associations with scientists who are characterized in vivid sketches. It tells of *Polar Star's* search for Mt Siple, cold weather survival school and igloo building, C-130 landings on blue ice fields in search of meteorites, sweating out the weather returning to base in a helicopter, a dry valley 40-year rock erosion project, seals, skuas, and penguins, and many other research topics. It is a condensed, anecdotal, swiftly paced description of a hands-on learning experience which bears the clear ring of authenticity.

A-34749

National Research Council. Polar Research Board, **Report on United States antarctic research activities, February 1985-October 1986; United States antarctic research activities planned for October 1986-September 1987,** Washington, D.C., National Academy Press, 1986, 100p., Bibliography p.60-90.

An outline is given of the U.S. antarctic research effort during the period specified. Fields of investigation include aurora, airglow, astronomy, cosmic radiation, ionospheric and magnetospheric physics, meteorology, cartography, geology, geophysics, glaciology, oceanography, station seismology, biological and medical sciences, and research vessel operations. The outline includes location, specific activity, frequency of measurement or observation, elements measured or observed, and instrumentation. In some programs names of participants are given.

A-34757

National Research Council. Polar Research Board, **U.S. research in Antarctica in 2000 AD and beyond; a preliminary assessment,** Washington, National Academy Press, 1986, 35p.

This report is structured in outline form to briefly present major considerations about antarctic science, on a discipline-by-discipline basis. It offers unweightcd lists, implying no priority, of important and major research goals that antarctic scientific researchers of today think will be of importance to antarctic science in the next century. Components of an optimal scientific plan designed to fulfill U.S. antarctic science needs in the twenty-first century are presented. The scientific objectives represent the board's careful selection, on the basis of present knowledge and capabilities for research, of those scientific problems for which further study will provide the greatest contribution to an understanding of Antarctica and of global processes and environments. The board believes that these questions will continue to be important, as research proceeds. (Auth. mod.)

A-34783

Ray, L., **Polar regions: economic and strategic issues, Part 2. An imaginary continent which appeared beyond the ice,** *Géopolitique,* Winter 1984 No.5, p.104-110, 4 refs.

A brief sketch is given of the development of knowledge of Antarctica from ancient Greek times to the present day: the period of myth; the period of discovery and exploration; the scientific endeavors of the IGY, continuing on to the era of the Antarctic Treaty and the present widening interest in Antarctica evinced by the United Nations spurred by the possibilities of vast natural resources there.

A-34871

Australia. Department of Science. Antarctic Division, **Antarctic Treaty particulars for the Australian National Antarctic Research Expeditions (ANARE): exchange information under Article VII(5) for 1986-87; Modifications of activities previously reported under Article VII(5) for 1985-86,** 1986, 67p.

Some 16 items ranging from transport to and from Antarctica, through personnel details, small arms, scientific programs and equipment, emergency assistance facilities, radioactive materials, and tourist reports are included as exchange information for 1986-87. Three modifications are made for the 1985-86 plans: expedition itinerary, personnel details, and animals killed or captured.

A-34885

Joyner, C.C., **Protection of the antarctic environment: rethinking the problems and prospects,** *Cornell international law journal,* Summer 1986 19(2), p.259-273, 56 refs.

Significant threats posed to the antarctic environment by enhanced prospects for resource-related activities—such as harvesting of circumpolar fisheries, mineral exploration and hydrocarbon development—are discussed. The paper attempts to place these threats into clearer perspective, to assess their likelihood, and to survey the possible legal and political options available to prevent their occurrence.

A-34899

New Zealand Antarctic Society, **Antarctic, Vol.11, No.1,** Christchurch, 1986, p.1-52.

Brief resumés are given of antarctic activities of New Zealand, Australia, South Korea, the United Kingdom, and the United States. General news items include accounts of various ships trapped in ice; an Australian yacht sailing as far south as Cape Hallett; climbing the Vinson Massif; Project Blizzard, a private expedition, completing its second season; science programs on Campbell Island; the whereabouts of the 18th century American trading vessel *General Grant;* the German freighter *Erlangen* in New Zealand waters at the outbreak of WW II; discovery of a 75-year-old food cache; the last survivor of Scott's 1910-13 expedition turning 98; a set of 12 medals sold at auction; and the obituary of T.L. Young, a pioneer in Ross Sea whaling.

A-34905

Detjen, J., **Antarctic awakening,** *World & I,* Dec. 1986 1(12), p.154-163.

Popular account of various scientific programs under way in the McMurdo-Beardmore Glacier region.

A-34906

Froehlich, W., **My eight hours at the South Pole,** *World & I,* Dec. 1986 1(12), p.164-166.

This personal account of a brief visit to the South Pole emphasizes the isolation of the region.

A-34907

Kautzleben, H., Frey, R., **Research goals in Antarctica; international law, and general results of research** [Forschungsobjekt Antarktis: Völkerrechtliche Situation und generelle Forschungsergebnisse], *Wissenschaft und Fortschritt,* 1986 36(3), p.72-75, In German.

Aspects of the interest in Antarctica being generated internationally are enumerated, mainly the prospects of natural resources expected to be found there, but also including intellectual pursuits such as the global effects antarctic weather systems and the general advancement of scientific knowledge. Four charts are included in the paper: the geographic relationships between Antarctica and nations and surrounding waters of the Southern Hemisphere; a map of current territorial claims in Antarctica; a map of zones of the Antarctic Convergence and Divergence, of the various stages of sea ice, and of no ice; a map of Antarctica and other countries comprising Gondwanaland during Paleozoic times. These charts are explained and discussed. A review is given of research results in glaciology, climatology, oceanology, biology, and geology.

A-34909

Tokyo. National Institute of Polar Research, **Science in Antarctica, Vol.9: Data compilation** [Nankyoku no kagaku 9 Shiriohen], Tokyo, Kokon Shoin, 1985, 288p., In Japanese. Refs. p.285-288.

The volume, compiled by the entire teaching staff of teh NIPR and others, contains a wealth of reference data and information. Though primarily in Japanese, there are numerous notations, symbols, and words understandable to the English-speaking reader. More than half the book is arranged by discipline: Chapters 1-7 deal with earth sciences, snow and ice, meteorology, upper atmosphere, meteorites, biology, and oceanography, respectively. Chapter 8 is a glossary of international and scientific terms identified in both languages and defined in Japanese. Chapter 9 is a list of acronyms identified in both languages. Chapter 10 lists geographic locations in the Showa Station region. Names of the features are in Japanese with Romanized versions and geographic coordinates. Chapter 11 lists antarctic stations, some of the sub-antarctic islands, and national institutions which manage antarctic research programs. Chapter 12 lists standard measurement symbols, definitions, units of measurement, and equivalents. Chapter 13 is a chronological list of antarctic discovery and exploration activities from 1738 through 1984.

A-34941

Levesque, M., **Polar way of life,** *Appalachia,* Jan./Feb. 1987 53(1), p.16-18.

A thumbnail sketch is given of the historic background of Antarctica and the development of the United States presence there. The essay is based on the author's three visits to Antarctica, including a year's sojourn at the South Pole.

A-35005

Thirteenth Antarctic Treaty Consultative Meeting, **Final report,** Brussels, 1986, 232p.

Delegates from 19 Consultative Party nations and 14 non-Consultative Party nations comprised the meeting. An agenda was adopted and discussions ensued following opening addresses by the delegations. Among the issues considered were operation of the Antarctic Treaty; specially protected areas; information exchange; dissemination of weather data; tourism; appointment of observers at consultative meetings; uses of antarctic ice; and antarctic inspections. Two working groups were appointed to deal with specific agenda items. Recommendations emanating from these discussions reached a total of 16 and are published in full text.

A-35029

Bjelke, R., Shapiro, D., **Northern Light,** New York, Clarkson N. Potter, Inc., 1986, 116p.

DLC G587.B53

This lavishly illustrated book captures the highlights of a 2-year, 33,000-mile sailing voyage of the Scandinavian yacht *Northern Light,* from Sweden to north of Svalbard, then south to Antarctica and back, with a crew of two. Technical information, such as the ship's dimensions, design, and equipment, is included.

A-35053

Jażdżewski, K., **Third antarctic expedition of Polish biologists, 1973-1974** [Trzecia antarktyczna wyprawa polskich biologow, 1973-1974], *Kosmos. Seria A,* 1974 23(5), p.563-568, In Polish.

The 3rd Polish Antarctic Expedition, leaving Poland on Oct. 1973 on board the *Professor Vize* with destination to Molodezhnaya Station, is discussed. The itinerary and names of participating scientists are given. The highlights of the voyage include description of the natural beauty found at Bellingshausen Station and the first encounter with the various species of seals and penguins which are part of that environment. The buildings and surroundings of Molodezhnaya are next described, with brief reference to research carried out there by Soviet scientists, mainly meteorological and synoptic studies. The reseach program of the Polish investigators is outlined, covering sea water and fresh water studies, primary productivity, biological, taxonomic and statistical features of fish, crustaceans, birds and other local living forms. All species investigated are listed. The article concludes with a paragraph on the return trip in early Mar. 1974.

A-35117

U.S. National Science Foundation, **Antarctic journal of the United States, Vol.21, No.3,** Washington, D.C., Sep. 1986, 24p.

This issue of AJUS is devoted to various aspects of the 1986-1987 research program. An early start was made on the ozone research project with 12 scientists arriving at McMurdo in August. General views are given of research objectives in atmospheric physics, glaciology, biology, ocean sciences, and earth sciences. These are followed by précis of specific projects in these disciplines, along with investigators' names and affiliations. A look is also taken at the logistics of the programs and support at the stations, in the air and at sea. A new data acquisition and display system for NSF's LC-130R is described. NSF funding awards for antarctic research for 1/30/86 through 6/30/86 are listed. Weather data measurements at McMurdo, Palmer, Siple, and South Pole Stations are given for May, June, and July 1986.

A-35131

Gardiner, H.E., **Cruise to the Sub-Antarctic,** *Explorers journal,* Mar. 1983 61(1), p.42-44.

An account is given of a cruising expedition to the subantarctic islands of seven members of the Explorers Club, among the 65 passengers on board the *Lindblad Explorer* in the austral summer of 1980-1981. Geographic characteristics of the islands, the flora and fauna encountered there, the weather conditions, sailing difficulties and other pertinent details are described.

A-35145

Larminie, F.G., **Mineral and maritime resources of Antarctica,** Australia, Britain and Antarctica, edited by T.B. Millar, London, Australian Studies Centre, University of London, 1986, p.19-24, 1 ref.

DLC JX4084.A5A97 1986

A review of antarctic resources is given and the conclusion is drawn that of all resources, renewable or non-renewable, krill is the

only one with a possible present economic value. Even with krill there is insufficient knowledge to regard them as any more than just possible. Knowledge of other resources is speculative, conjectural, or by inference; conclusions that regard mineral resources as promising are based on a misinterpretation of the terms "occurrence" and "deposits." Technology to recover resources in economically sound quantities is not now available nor will it become so in the foreseeable future; markets are few and distant; and the land is entirely inhospitable, even more so than the Arctic.

A-35146

Drewry, D.J., **International scientific coordination in Antarctica,** Australia, Britain and Antarctica, edited by T.B. Millar, London, Australian Studies Centre, University of London, 1986, p.25-36.

DLC JX4084.A5A97 1986

Scientific coordination in Antarctica is viewed in the broader environment of geopolitics involving national interests, international issues, the strategic value of the region, and economic and commercial enterprises. Elements comprising scientific coordination include communication, cooperation, and collaboration which are discussed as basic considerations for any operations in Antarctica because distances, costs, and logistics inherent to the area are problems which must be solved jointly. Trends in coordination are being set by current rising interest in Antarctica; antarctic environmental systems; nations new to antarctic research acceding to the Antarctic Treaty; development of commercial and economic interests; and indications of a decrease in coordination, for a variety of reasons. These trends are discussed and point to new directions for future coordination; identification of new scientific issues; development of large-scale, multi-national, multi-disciplinary projects; and the establishment of new or extension of existing organizational structures.

A-35247

Burckle, L.H., ed, Denton, G.H., ed, Vrba, E.S., ed, Partridge, T.C., ed, **Palaeoclimate and evolution III,** *South African journal of science,* Sep. 1986 82(9), p.493-522, In English with Afrikaans summary. For selected individual papers see E-35250, E-35253, E-35255, E-35257 through E-35259, F-35249, F-35252, F-35256, I-35248, J-35251 and J-35254. 4 refs.

The third meeting in the Palaeoclimate and Evolution series was held on 20-24 May, 1985 at the Lamont-Doherty Geological Observatory, Palisades, New York. Discussions were confined to late Neogene climatic history of the antarctic continent and the surrounding southern ocean. Within that context, three basic themes were developed: oxygen and carbon isotope history, palaeoceanography, and the late Neogene glacial and geological history of the continent. (Auth.)

A-35294

Australia. Department of Science and Technology. Antarctic Division, **ANARE news, No.48,** Kingston, Tasmania, 1986, 20p.

Brief reports are given on: *Icebird* and *Nella Dan* sailings and schedules; search for antarctic dolphin fossils; automatic weather station operational in the Mawson area; establishment of a Polar Platform Study Group; whale skulls on Heard Island; Antarctic Science Advisory Committee meeting; the 9th meeting on antarctic mineral resources; two *Sites of Special Scientific Interest* created near Casey Station; 1986 meetings of the Commission for the Conservation of Antarctic Marine Living Resources in Hobart; the history, responsibilities, and activities of ANARE and the Antarctic Division; an antarctic sculpture unveiled; a stamp issued commemorating the 25th anniversary of the Antarctic Treaty; and the Aug., Sep., and Oct. 1986 weather conditions at Mawson, Davis, Casey, and Macquarie Island.

A-35307

Santiago de Chile. Instituto Antártico Chileno, **Boletín antártico chileno, Vol.6, No.2,** July-Dec. 1986, 92p., In Spanish.

This bulletin describes the following: commemoration of the 70th anniversary of the rescue of 22 members of the *Endurance* crew, carried out by the Chilean vessel *Yelcho* under command of the pilot Luis Pardo Villalón; the 19th SCAR meeting in San Diego, California, June 16-27, 1986; the conservation measures adopted at the 5th CCAMLR meeting in Australia, Sep. 8-19, 1986; some features of the FIBEX and SIBEX cruises; the activities on the *Polar Duke* during the DO 186 expedition; some notes on the 13th Antarctic Treaty Consultative Meeting; and various news items, including the INACH inauguration of 4 postal stamps depicting antarctic birds, and INACH activities at the Fildes Station. For additional articles, abstracted separately, see A-35309, A-35310, B-35308 and I-35311.

A-35309

Arias E., L., **Towards an antarctic minerals regime** [Hacia un régimen de recursos minerales antárticos], *Boletín Antártico Chileno,* July-Dec. 1986 6(2), p.14-21, In Spanish. 10 refs.

Various international meetings are reviewed, in chronological order, which addressed the issue of commercial exploitation of antarctic mineral resources in terms of negotiations for a legal body within the Antarctic Treaty System capable of keeping a balance between environmental and developmental concerns. A table of the conferences is presented showing name, date, place and purpose/outcome of each. Particular attention is given ot the "Beeby documents" 1, 2 and 3.

A-35310

Barrera V., H., **International mountaineering in Antarctica** [Montañismo internacional en el continente antártico], *Boletín Antártico Chileno,* July-Dec. 1986 6(2), p.22-29, In Spanish.

General background information on the antarctic mountain system is provided, and areas are named and described where successful climbs have been carried out in pursuit of sports or scientific research. Various expeditions, from 1898 to 1985, are briefly described.

A-35313

Oslo. Norsk Polarinstitutt, **Yearbook of the Norwegian Polar Research Institute, 1985** [Årbok 1985], Oslo, 1986, 47p.

The report contains a description of the institute's organization, personnel, field work (in Svalbard, Mainland Norway and Antarctica) and activities of the various sections (biology, geology, geophysics, geodesy, cartography, place names, computer work, information, logistics, etc.). The institute's data bases, maps, publications and meetings are also listed. The main antarctic effort was the 1984/85 Norwegian Antarctic Research Expedition (NARE) to the Weddell Sea area, with 77 participants (28 scientists). The program included establishment of 2 summer stations on Queen Maud Land, ornithological observation, topographic work by satellite and triangulation, glaciological, geological and biological sampling, magnetic profiling and other studies. A more detailed account of the expedition was published in NARE Report No.22, 1985 (see 15D-32617).

A-35318

Smith, R.I.L., Simpson, H.W., **Early nineteenth century sealers' refuges on Livingston Island, South Shetland Islands,** *British Antarctic Survey. Bulletin,* Feb. 1987 No.74, p.49-72, 57 refs.

A brief history is given of the fur seal industry in the South Shetland Islands during the 19th century. When the islands were dis-

covered in 1819 they abounded with fur seals, particularly Byers Peninsula, Livingston Island. During the period 1820-23 several hundred thousand skins were taken and the population was almost exterminated, although there was a modest revival of the industry during the 1870s and 1880s. During the first two or three years of fur seal exploitation up to 200 men lived ashore for part of each summer, on the western part of Livingston Island, in small drystone huts and in caves. The distribution of these relics of habitation is documented and an illustrated account given of artifacts found in two of these. The importance of these historical sites throughout the South Shetland archipelago is stressed and a plea made for their conservation and for a professional archaeological survey to be made. (Auth.)

A-35326

Roland, N.W., **Availability of mineral resources in the Antarctic** [Verfügbarkeit mineralishcher Ressourcen in der Antarktis], *Geowissenschaften in unserer Zeit,* Sep. 1986 4(5), p.154-163, In German. 18 refs.

A few of the extreme characteristics of Antarctica are listed: most isolated, least accessible, coldest, windiest, driest of all continents. Theoretical considerations for mineral deposits are mentioned including a relationship to the Gondwana concept. A more detailed treatment is given of individual deposits such as tin, iron, copper, molybdenum, coal and oil, with indication of general locations and estimates of percentages of deposits. Problems of exploration and finding these minerals are discussed in terms of accessibility; existing knowledge of the occurrence of raw minerals; limitations of prospecting methods; and abundance of deposits. The paper closes with a discussion of the problems associated with mining these materials, taking into account the high costs of the various facets of mining operations; market economy; and technical, political, and ecological factors.

A-35332

Scott, P., **Antarctic challenge,** *National geographic magazine,* Apr. 1987 171(4), p.538-543.

The author, son of Robert Falcon Scott, provides some insights to the legacy his father left to him through his mother and his writing. A deep concern is expressed for the future of Antarctica along with a hope to preserve this last remaining natural environment as a World Park.

A-35334

Vesilind, P.J., **Antarctica,** *National geographic magazine,* Apr. 1987 171(4), p.556-560.

A bare bones overview is given of the Antarctic Treaty and its implications for global science, natural resources, and political activities.

A-35389

Asociación Antártica Argentina, **Antártida Argentina, No.24,** Buenos Aires, 1986, 72p., In Spanish.

This journal comprises a collection of short biographical articles, memoirs, a list of conferences, correspondence, reminiscences of national and foreign expeditions in which Argentina participated, and news items of popular interest about the Antarctic.

A-35398

Kornilov, N., **Soviet expeditions to Antarctica,** *Soviet shipping,* July-Sep. 1984 4(3), p.37-39.

In this article, the Deputy Director of the Arctic and Antarctic Research Institute, the Soviet Union's Leningrad-based leading research center for the Antarctic, reviews the history of Soviet activities in the Antarctic, from the first expeditions and the building of permanent stations to current large-scale programs. The emphasis is on the ships that serve the Soviet research effort. Their names are listed, along with some of the activities in which they participated.

A-35561

Abbott, S.B., Hushen, W.T., **Polar Research Board: Antarctic-related activities June 1984 to June 1985,** *Antarctic journal of the United States,* 1985 20(5), p.249-250.

A brief account is given of the Board, its composition, areas of expertise, goals, relationships with U.S. scientists and international groups, particularly with SCAR, meetings held or attended, development of antarctic scientific policy matters, reports published and workshops sponsored, program support, and scientific applications having or likely to have significant impact on a global basis.

A-35564

Holoviak, J.C., **Antarctic Research Series,** *Antarctic journal of the United States,* 1985 20(5), p.253-254.

A brief description is given of the Series: the audience to which it is directed; aims; format for papers and publication policies; the peer review process; and theme proposal procedures. A list of 1984-1985 publications showing authors and titles, is included.

A-35565

Thuronyi, G.T., **Conference papers in the *Antarctic Bibliography*,** *Antarctic journal of the United States,* 1985 20(5), p.254-255.

The question considered is the value of conference papers as an information source to scientists in a given field. Fifty conference papers written in English by 50 different authors were examined using the following criteria: do the papers contain original material; are the papers later published in refereed journals; do the authors publish elsewhere. Comparing each author's publications during a five year period centered on the date of the conference, it was concluded that conference papers represent a significant, singular contribution to antarctic scientific literature.

A-35589

Myrcha, A., Tatur, A., **Argentinian-Polish scientific cooperation in Antarctica (1984-1986),** *Polish polar research,* 1986 7(4), p.427-431.

The antarctic expeditions carried out by Polish and Argentine scientists on King George I., the Antarctic Peninsula and Seymour I., are described. The programs included analysis of cores of bottom sediments from various lakes and detailed examinations of ornithogenic soils, including the mineral composition of phosphates. Also reported is a collection of rocks, samples of petrified flora and fauna, and contemporary plants from different locations. A fossil penguin bone and a few bivalves in calcareous sandstone from La Meseta Formation, Seymour I., are illustrated.

A-35626

Walton, D.W.H., ed, **Antarctic science,** Cambridge, Cambridge University Press, 1987, 280p., Includes an introduction by Vivian Fuchs. Bibliography p.272-273. For individual papers see A-35627, B-35628, F-35629, I-35630 and M-35631, or 41-3532.

DLC G860.A555 1987

The book attemps to put Antarctica into a general perspective, responding to the recent upsurge of interest in the region at the UN and within other international organizations. Authors of the individual parts have selected for discussion some of the most significant developments in their special areas of expertise during the past 25 years when antarctic scientific research blossomed. These areas include geography, politics and science; life in a cold environment; antarctic ice and rocks; the antarctic atmosphere; and science, the Treaty and the future.

A-35627

Walton, D.W.H., **Geography, politics and science,** Antarctic science, D.W.H. Walton, ed., Cambridge, Cambridge University Press, 1987, p.5-68, 21 refs. (p.272).
DLC G860.A555 1987

There is much history here, from the 18th century to and beyond the mid-20th: the people, the ships, the expeditions; the development of science from the early efforts through the International Polar Years through the IGY and the advent of the Antarctic Treaty. Changes in scientific emphases are noted and political considerations interposed. The impact of air transportation altered much thinking and the development of large icebreaker/research vessels opened new pathways for science. Through the Antarctic Treaty political issues were for the most part set aside in the interests of achieving a favorable atmosphere for an almost infinite variety of research programs. In that respect the Treaty has proven itself a most remarkable scientific instrument.

A-35633

Torrejón, A., **Argentina, Antarctica and tourism** [Argentina, la Antártida y el turismo], *Revista patagónica,* Jan.-Mar. 1986 No.25, p.3-6, In Spanish.

The necessity that the Argentine government continue transporting tourists from Argentina to Antarctica, as had been done in 1933 and repeated in 1958, is discussed as a means to stress the geographic continuity of Argentina and strengthen its claim on Antarctica. Six recommendations are proposed for a successful touristic enterprise.

A-35634

Torre, G., **Tourism to Antarctica** [Turismo a la Antártica], *Revista patagónica,* Jan.-Mar. 1986 No.25, p.7-9, In Spanish.

Following a statement that Argentina was the first among the nations signatories of the Antarctic Treaty to promote tourism in Antarctica, various touristic expeditions are reviewed, beginning with the first cruise, in 1933, carrying 16 passengers to South Orkney Is. Two cruises in 1958, organized by the Argentine Navy, transported 100 and 94 tourists, respectively. Cruises organized by the Dirección Nacional de Turismo carried thousands of tourist to Antarctica in 1970, 1973 and 1976. Currently, the touristic activities between Argentina and Antarctica are in charge of private organizations.

A-35635

Pontoriero, F., **Nordenskjold, Larsen and Sobral in Antarctica again** [Nordenskjold, Larsen y Sobral, de nuevo en la Antártida], *Revista patagónica,* Jan.-Mar. 1986 No.25, p.10-13, In Spanish.

A brief review is given of the 1901 unhappy expedition to Antarctica by the Swede O. Nordenskjold and the Norwegian C.A. Larsen on the ship *Antarctic,* which sank near the island Cerro Nevado. The two scientists and the crew were rescued in 1903 by the Argentine José M. Sobral in command of the ship *Uruguay.* Also described are the ceremonies carried out on the Argentine base Ejército Esperanza, celebrating the anniversary of the above events, with the participation of the descendents of the three men who followed the route of the *Antarctic* and the *Uruguay* on board the *ARA Bahíd Paraíso,* 84 years later.

A-35651

Morosini, M., **Sailboat among the icebergs** [Una vela tra gli iceberg], *Atlante,* Aug. 1985 p.30-45, In Italian.

The adventures of an international group of 7 scientists and mountain-climbers, travelling to the Antarctic Peninsula on board the sailboat *Basile,* are narrated. The sailboat, especially designed for ice navigation, is described in detail. Highlights of the scaling of Mount Scott, and attractive photographs, are presented. A collection of mosses and lichens, to be analyzed at the University of Siena, is reported; preliminary analyses disclosed the occurrence of measurable quantities of hydrocarbons and pesticides in the samples.

A-35685

Kawaguchi, S., ed, Watanabe, O., ed, **Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology,** *Tokyo, National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, 113p., Refs. passim. For individual papers see F-35690 through F-35697 and I-35686 through I-35689, or 41-3654 through 41-3662.

The Eighth Symposium on Polar Meteorology and Glaciology was held in Tokyo on Dec. 11-12, 1985. The research areas covered were: atmospheric constituents and aerosols, radiation, sea ice and physical oceanography, atmospheric circulation and climate, ice sheet and snow cover, snow crystals, atmospheric boundary layer and instrumentation. A total of 61 papers were presented and the present volume contains 12 full-length papers and 29 abstracts; the full-length papers are arranged in the order of scientific areas of meteorology, glaciology and physical oceanography. (Auth.)

A-35698

Belsky, M.H., **Legal constraints and options for total ecosystem management of large marine ecosystems,** Variability and management of large marine ecosystems. Edited by K. Sherman and L.M. Alexander, Boulder, Westview Press, 1986, p.241-261, Refs. p.255-261.
DLC QH541.5.S3V35

This paper, presented at a symposium held at the 1984 American Association for the Advancement of Science Annual Meeting in New York City, May 24-29, describes the legal superstructure for regulating activities in the oceans and how it has been evolving in the last twenty years to provide increased opportunities for total ecosystem management of the oceans. It concludes with the suggestion that, because of its unique history of international cooperation and environmental protection, the management of Antarctica's resources can be an international demonstration of the possibility and potential of total ecosystem management. (Auth. mod.)

A-35712

Walton, D.W.H., **Antarctic exhibition afloat,** *Polar record,* Jan. 1987 23(145), p.448-450.

Details of a four-day exhibition on the British Antarctic Survey's current scientific work are discussed. RRS *Bransfield,* the larger of the two BAS ships, was converted to exhibition use. Lighting systems and power points were fitted to the two main cargo holds, a temporary stairway was constructed from the forward tween deck up through the cargo hatch to the main deck, and modifications were made to other parts of the ship to allow for controlled public access. *Bransfield* sailed up the Thames from Tilbury and under Tower Bridge to moor alongside HMS *Belfast* from June 3-9.

A-35714

Scientific Committee on Antarctic Research, **SCAR bulletin No.85, Jan. 1987,** *Polar record,* Jan. 1987 23(145), p.483-504.

Details of the 19th SCAR Meeting, held in San Diego June 23-27, 1986, are reported. They include: recommendations from the Working Group meetings at SCAR 18; reports from the chief officers of all the permanent working groups, except Meteorology, on their activities since SCAR 18; approval of various proposals; reports from the convenors of the 5 SCAR Groups of Specialists; relations with ICSU bodies and intergovernmental bodies; 2 appendixes including guidelines for the conduct of SCAR affairs and a list of recent SCAR symposia, SCAR-supported symposia, and future symposia. In addition, the bulletin presents: the Report of the Finance Committee; summary reports of SCAR Working on Biology and on Upper Atmosphere Physics; the annual report of the BIOMASS Executive Com-

mittee for the period Sep. 1985-Aug. 1986; activities of the ISCCP Workshop on Polar Clouds held in Tokyo Aug. 19-21, 1986; and a note on a new SCAR publication.

A-35725
Zumberge, J.H., **The Scientific Committee on Antarctic Research, the Antarctic Treaty and Conservation in Antarctica,** *Environment international,* 1987 13(1), p.3-7, 6 refs.

A Symposium on Scientific Requirements for Antarctic Conservation was jointly sponsored by the International Union for the Conservation of Nature and Natural Resources (IUCN) and the Scientific Committee on Antarctic Research (SCAR), and was held in Bonn, Federal Republic of Germany in Spr. 1985. IUCN and SCAR are different in scope of mission, criteria for membership, and financial resources in support of their activities. The two organizations find a common ground in conservation in the Antarctic. SCAR and the Antarctic Treaty came into being as a result of the 1957-1958 International Geophysical Year and although the Consultative Parties of the Treaty and SCAR have no formal relationship, SCAR has responded to frequent requests from the Treaty nations for scientific information and advice related to the formulation of policy. The role of the Consultative Parties was debated in the United Nations General Assembly where some members of the Third World Nations challenged the exclusivity of the Treaty Nations in the governance of Antarctica. They proposed instead that Antarctic affairs should be regulated under a UN trusteeship because Antarctica is "the common heritage of all mankind." To explore this controversy in all its ramifications, an informal workshop was held in a remote site in Antarctica in Jan. 1985. (Auth. mod.)

A-35728
Bonner, W.N., **Antarctic science and conservation—the historical background,** *Environment international,* 1987 13(1), p.19-25, 22 refs.

James Cook in his voyage of 1774-1775 is generally credited with the discovery of the Antarctic. He was soon followed by fur sealers. Besides sealers, there were purely scientific expeditions to the Antarctic in the early 1800s. Exploratory whaling voyages began in 1873-1874, but the antarctic whaling industry was not established till 1904. Attempts to regulate whaling were unsuccessful, and following the reduction of the stocks of whales, the industry has collapsed. The development of whaling was accompanied by scientific exploration and research. Antarctic exploration developed between the two World Wars. After the Second World War there was a resurgence of interest in the Antarctic. Territorial claims caused political tensions, but these were temporarily assuaged during the International Geophysical Year, 1957-1958, when 12 nations cooperated to establish 47 research stations in the Antarctic under the aegis of the Antarctic Treaty. This treaty, together with two other associated instruments, provides the legal framework for present-day conservation in the Antarctic. (Auth. mod.)

A-35739
Crockett, R.N., Clarkson, P.D., **Exploitation of antarctic minerals,** *Environment international,* 1987 13(1), p.121-132, 11 refs.

Exploitation of minerals either from continental shelves or land areas free of ice has yet to take place in the Antarctic. The paper considers pressures, commercial, strategic, and possible depletion of resources elsewhere that might encourage moves towards exploitation. A brief review is given of technical developments that will be required to allow minerals operators to establish themselves in the hostile antarctic environment. Finally, the issues that arise in the control of mineral exploitation in a region not subject to conventional national authority are noticed and the necessary conditions for the supervision of such activity, and the protection of the antarctic environment are outlined. (Auth.)

A-35740
Erize, F.J., **Impact of tourism on the antarctic environment,** *Environment international,* 1987 13(1), p.133-136.

Tourism is well established in the Antarctic. Its impact is at present limited. Most tourists come by sea. There are two types of cruise; natural history cruises, mostly in small vessels, and more traditional entertainment cruises in larger passenger ships. Small numbers of private expeditions, mostly in yachts, visit the Antarctic. Official guests of the direction or management of research stations may arrive by supply ship or by air. Some tours arrive by plane and stay only a short while. Tourism is unlikely to increase much in the near future because of its high cost, the risk of passenger dissatisfaction on account of bad weather, and the difficult financial situation of some countries. Impacts arising from tourist activities are discussed. (Auth. mod.)

A-35770
Chiron, S., **Three reporters 11 to 16 years old in Antarctica** [Trois reporters de 11 à 16 ans en Antarctique], *Science et vie,* May 1987 No.836, p.44-47, 158, In French.

A detailed account is given—by one of the three young participants, winners of a "Three weeks in Adélie Land" contest—of the adventures and impressions of the trip. The trip established a youth record for visitors to Antarctica.

A-35847
Splettstoesser, J., **Polar research,** *Geotimes,* Feb. 1987 32(2), p.49-50.

Significant discoveries and collections made by international groups of scientists in various parts of antarctica, activities in the U.S. related to antarctic programs, recent publications on polar earth sciences, and studies in polar regions supported by the National Science Foundation, are reviewed.

A-35865
Roland, N.W., **Prospecting in Antarctica? Geological, economic and political aspects,** Prospecting in areas of glaciated terrain. Seventh international symposium, Kuopio, Finland, Sep. 1-2, 1986, London, Institution of Mining and Metallurgy, 1986, p.175-186, 31 refs.
DLC TN270-A1P8

The Antarctic is broadly considered and optimistically called the "treasure house of mankind". In analogy to the surrounding continents of South America, Africa, India, and Australia, with which Antarctica formed the Gondwana supercontinent more than 200 Ma ago, Antarctica could indeed contain valuable mineral deposits. But the Antarctic is also the coldest, driest, windiest, least accessible, and least known of all the continents. Only 2% of it is free of snow and ice, and thus open to geological exploration during the few summer months. However, it is not only the inhospitality of the environment that might prevent a run on the mineral resources. Today's geological knowledge of the continent in general is still poor and there are technical, economical, and, last but not least, political factors which prevent mining in Antarctica for the present. (Auth.)

A-35868
Scott Polar Research Institute, **SPRI review—86; sixtieth annual report: year ending September 1986,** Cambridge, University of Cambridge, 1986, 26p.

The report reviews SPRI activities during 1985-1986 academic year, from field-work programs in both the Arctic and Antarctic to teaching/lecture series to degree seeking students; sea ice studies; glacier geophysics; remote sensing; and developments for 1986-1987.

A list of publications is given and library and information services are reviewed; the staff is listed and gifts to the institute are acknowledged. Research abstracts are included.

A-35873

Comerci, S.M., **Pioneer presence of the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" in the Antarctic** [La presencia pionera del Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" en el Antártico], *Buenos Aires. Instituto Antártico Argentino. Publicación,* 1986 No.17, 59p., In Spanish with English, German and French summaries. 22 refs.

A collection of documents housed in the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, originating as reports or letters from Argentine investigators in South Orkney and South Shetland islands, mainly between 1923 and 1943, is used as source for this review in 6 parts. The first 3 parts deal with the history of Argentina's involvement in Antarctica since the 19th century, its various whaling expeditions and the participation of the Museo in antarctic activities. Parts 4 and 5 discuss the cooperation between the Museo and the Argentine army in geological research conducted on Isla de los Estados in 1933 and in Bellingshausen Sea in 1942, offering complete texts of the reports dealing with topographic details and paleontological and petrologic findings. The logistics and political significance of the 1943 expedition to Deception and Melchior islands, and Marguerite Bay, are also reviewed in this section. The concluding portion is dedicated to 4 pioneer women scientists, affiliated with the museum, on a trip to Melchior Is. in the summer of 1968-1969 involving marine biology research. Here, again, the text of the report with general information concerning the biological findings in the area, and written by one of the participants, is presented.

A-35886

Montevideo. Instituto Antártico Uruguayo, **Actividad científica, 1985/86, Vol.1,** Mar. 20, 1987, 71p., In Spanish. Refs. passim.

The purpose of this new publication of the Instituto Antártico Uruguayo is to contribute to the dissemination and exchange of scientific information on Antarctica within the framework of the Antarctic Treaty. The publication includes reports of investigations carried out in the fields of meteorology, oceanography, cartography, biology and ecology. For individual papers see B-35890 through B-35892, C-35889, I-35887, and J-35888.

A-36010

Zhang, Q., **Record of antarctic observations** [Nanji kaochaji], Beijing, Knowledge Press, 1981, 121p., In Chinese.

The author, a Chinese scientist, was invited in 1980 to join an Australian antarctic expedition as an observer; this is the record of his impressions, written after his return. The trip began on Jan. 6, 1980 and lasted two months. It is considered the first such trip for a Chinese scientist. The book consists of more than 40 brief chapters, including accounts of meetings with Australian and New Zealand scientists, personal experiences relating to the natural landscape, special climatic characteristics, animals, and mineral resources in Antarctica. In the appendix there is a concise but comprehensive section on "A Survey of General Conditions in Antarctica," pp.95-111. The author made a second trip to Antarctica in Dec. 1980, staying at Davis Station for three weeks.

A-36017

Kimball, L.A., **Report on Antarctica,** Washington, D.C., International Institute for Environment and Development, June 19, 1987, 32p., Refs. p.30-32.

Section 1 of this report covers developments that have taken place since IIED issued its previous 'Report on Antarctica' on Nov. 8, 1985. Reviewed are: the 3rd and 4th United Nations General Assembly, the Marine Living Resources Convention, minerals regime negotiations, Antarctic Treaty Consultative Meeting and related SCAR developments, the antarctic seals convention, and SCAR/IUCN Working Group on Conservation. Section 2 comments on these developments as they play a role in the evolution of the Antarctic Treaty System (ATS) and contribute to its effective operation. It explores the further integration of the ATS into a comprehensive management and conservation regime for Antarctica and the southern ocean, and the future of the ATS in light of debates in the United Nations General Assembly. (Auth. mod.)

A-36024

Tokyo. National Institute of Polar Research, **Japanese antarctic activities, 1986,** Tokyo, [1987], 31p.

After a brief history of past Japanese antarctic research expeditions, a summarized account is given of current activities in various disciplines and on various Japanese antarctic stations. Data include a chart showing the body of governmnetal agencies which form the Japanese Antarctic Research Expedition, and how these agencies interrelate; logistics on the research ship *Shirase* and a chronology of events between Sep. 1955 and Dec. 1985. The text is punctuated by color photographs of landscapes, animals, research facilities, instruments, etc.

A-36025

Tokyo. National Institute of Polar Research, **Japanese antarctic activities for 1986-1987,** Tokyo, [1987], 23p., Exchange of information under Article 7 (5) of the Antarctic Treaty.

The following data regarding Japanese antarctic activities for 1986-1987 are presented: details of ship, aircraft and other vehicles; the 28th Japanese Antarctic Research Expedition (JARE) itinerary on board the *Shirase;* details of stations; personnel; work program; scientific equipment; transportation facilities and communication equipment; facilities for rendering assistance; description of unoccupied refuges; notice of oceanographic research ships in the Antarctic Treaty area; list of members of JARE-28; information on telecommunication equipment and schedules at Showa Station and Asuka camp for 1987, and on the *Shirase* from Nov. 1986 to Apr. 1987.

A-36129

Dubrovin, L.I., Preobrazhenskaia, M.A., **What does the antarctic map say** [O chem govorit karta Antarktiki], Leningrad, Gidrometeoizdat, 1987, 160p., In Russian.

Dramatic, sometimes tragic and sometimes humorous, situations are described in 11 short chapters in connection with the antarctic continent and its place names. This includes Russian discoveries in Antarctica; the shores and land of Antarctica; the expedition ships and their captains; antarctic topography; research stations; names of Russian and Soviet scientists on foreign maps of Antarctica; female names; Soviet names; and names of mountains, plains and seas under antarctic ice.

A-36137

Laws, R.M., **Scientific opportunities in the Antarctic,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.28-48, 11 refs.

DLC JX4084.A5 A556 1987

Outlined are the diversity and interrelated nature of scientific research in Antarctica which influences the study of geology, geophysics, plate tectonics, glaciology, climatology, oceanography, meteorology and geophysics, biology and ecology of living organisms.

It is argued that the very special nature of antarctic research lies in the simplicity of the environment. There are few people, no industry; environmental impact and pollution are minimal; the rock structures are relatively uncomplicated; the ecosystems are non-specific and the ocean food webs are simple and dominated by krill as the key species. This simplicity provides scientists with unique opportunities to expand their knowledge. (Auth.)

A-36145

Barnes, J.N., **Environmental protection and the future of antarctica: new approaches and perspectives are necessary,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.150-158.

DLC JX4084.A5 A556 1987

A challenge is delivered to those authors who call for reform within the Antarctic Treaty system, by arguing that antarctic resource policies must be developed in light of evolving interests within the international community. The roles are described of non-governmental organizations, such as the Antarctic Southern Ocean Coalition, in the formulation of resources policy, and commends the formation of an Antarctic Environment Protection Agency. A call is made for a total moratorium on all minerals activities. The paper is critical of existing regulations on antarctic conservation, most particularly of the proposed construction of an airfield in Adelie Land and of the limited scope and number of protected sites within Antarctica. (Auth.)

A-36146

Watts, A.D., **Antarctic mineral resources: negotiations for a mineral resources regime,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.164-175.

DLC JX4084.A5 A556 1987

A warning is given here that there is little likelihood of commercial exploitation of mineral resources in Antarctica. Negotiations have been undertaken in order to establish a regime well in advance of technical developments and economic viability. The irony is noted that negotiations are easier when so little is known about mineral deposits and commercial prospects appear non-existent. It is emphasized that, in principle, mineral activities will be prohibited under a negotiated regime unless stringent procedural and substantive requirements are met. An outline is provided of the structure of a minerals regime which already attracts a certain measure of consensus. (Auth.)

A-36147

Larminie, F.G., **Mineral resources: commercial prospects for antarctic minerals,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.176-181.

DLC JX4084.A5 A556 1987

The paper provides a salutary caution to the grandiose expectations of those proclaiming a minerals boom in Antarctica. It is argued that prospects for antarctic minerals exploitation could well be considered 'virtually nil', that the negotiation of a minerals regime has no commercial motive and does not reflect pressure from the petroleum industry. The author warns against the negotiation of an overly detailed convention which cannot deal with, as yet, hypothetical problems. Rather, a general principles, evolutionary approach is urged to the establishment of an agreement. (Auth.)

A-36203

International Union of Geodesy and Geophysics, **19th General Assembly, Vancouver, Canada, Aug. 9-22, 1987. Programme and abstracts,** 1987, 4 vols.

A collection of abstracts of papers presented at numerous symposia in a wide variety of disciplines, the three abstract volumes contain approximately 50 items relating to Antarctica and numerous papers on other cold-regions phenomena. Abstracts pertinent to the Antarctic are in the following categories: oceanography (p.147-148); glaciology (p.147-148, 150-151, 861-862); terrestrial physics (p.695-696); atmospheric physics (p.697-700); and meteorology (p.859-860, 863-864, 883).

A-36205

New Zealand Antarctic Society, **Antarctic, Vol.11, No.4,** Christchurch, 1987, p.142-192.

Topics noted in this issue of the journal include: penguin studies at Cape Bird; antarctic plant life in the dry valleys region; stage six of the rebuilding program at Scott Base; television surveillance of Mount Erebus; Scott Base huskies phased out, transferred to Minnesota; New Zealand Governor-General visits Ross Dependency; satellite communications programmed for Australian bases; Italian summer station at Terra Nova Bay; SANAE summer program; Norwegian activities at Peter I Island; BAS summer programs; U.S. C-130, buried under snow for 15 years, brought to surface; international team working Filchner Ice Shelf/Weddell Sea region; airstrip planned for Marion Island; private Norwegian/British 90 Degrees South Expedition turns back short of Pole goal; Greenpeace seeks base at Camp Evans; remainder of the private Footsteps of Scott Expedition flown to Chile; obituaries of Ralph Lenton, Paul Clement Daniels, Norman Ridgway, and David W. Canham, Jr.

A-36212

Turner, J., **ARAMIS remote sensing system,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.75-85, 5 refs.

An account is given of the ARAMIS (Antarctic Research in Applied Meteorology, Imaging and Sounding) remote sensing system which has recently been installed in the Ice and Climate Division of the British Antarctic Survey. Details of the hardware are provided along with information on the applications software available to the users. Current meteorological remote sensing research being carried out on the system is outlined and possible applications for other disciplines are described. (Auth.)

A-36218

Duff, A., **Falkland fishing limits,** *Marine pollution bulletin,* Apr. 1987 18(4), p.145.

This is a short news item reporting on the imposition of fishing limits around the Falkland Is. by the British Government in response to an increase in the number of fishing vessels operating in the south-west Atlantic. A brief review is given of fishing exploitation in the area, of the history of protection measures proposed, and of possible future regulations.

A-36273

Victoria University of Wellington. Antarctic Research Centre, **New Zealand activities in Antarctica 1986/87. Seminar, March 1987. Abstracts,** *New Zealand antarctic record,* 1987 7(3), p.52-59.

This set of twelve abstracts of papers presented at the Seminar covers a wide range of topics including Mount Erebus eruption mechanisms; trace gases in the Ross Sea region; light scattering by sea ice; biological clocks of Adélie penguins; atmospheric mercury levels; stratospheric trace gases; antarctic environmental assessment; Ross Sea icebergs; Adélie penguins at sea; marine palynology in McMurdo Sound; Terrestrial palynology in McMurdo Sound; and surveys of Adélie penguin colonies.

A-36316
Santiago de Chile. Instituto Antártico Chileno. Comité Nacional de Investigaciones Antárticas, **Report on Chilean antarctic activities to SCAR No.29, 1987. Activities Apr. 1986-Oct. 1987; activities Oct. 1987-Oct. 1988** [Informe de las actividades Antárticas de Chile al SCAR No.29, 1987. Actividades abril 1986-octubre 1987; Actividades octubre 1987-octubre 1988], Santiago de Chile, June 1987, 44p., In Spanish and English. Bibliography p.40-42.

The Chilean antarctic scientific research program was conducted, in the 1986-1987 season, from 5 permanent bases—one operating only in summer, another in recess-4 INACH scientific stations, 2 temporary refuges, and 4 research ships. In parallel Spanish and English texts details of the programs are outlined in: meteorology, biology, geology, geodesy, ecology, terrestrial and atmospheric physics, oceanography, remote sensing, logistics, and tourism. For these programs, specific projects, tasks locales, and instruments are given. Planned activities for the 1987-1988 season are similarly outlined.

A-36355
Castellví, J., ed, **Second Spanish Symposium on Antarctic Studies, Madrid, July 13-15, 1987. Proceedings** [Actas del segundo Symposium Español de Estudios Antárticos, Madrid, 13 al 15 de julio de 1987], Madrid, Consejo Superior de Investigaciones Científicas, 1987, 447p., In Spanish with English summaries. Refs. passim. For individual papers see 42-526 through 42-528 or A-36390, B-36361, B-36363, B-36378 through B-36382, B-36384 through B-36388, E-36372, E-36375, E-36376, E-36383, F-36371, F-36392, G-36391, H-36389, I-36367 through I-36369, J-36356 through J-36360, J-36362, J-36364 through J-36366, L-36370, L-36373, L-36374 and M-36377.

This is a collection of papers, presented at the 2nd symposium on Spanish antarctic activities, reporting results of investigations conducted in the Antarctic by Spanish scientists during Nov. 1986-Jan. 1987. The papers are representative of the wide variety of interests focusing on Antarctica: biological, oceanographic, geological, atmospheric, and geophysical, as well as political and economic.

A-36390
Pastor, X., **Possible role of Spain in the protection of Antarctica** [La protección de la Antártida. El posible papel de España], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.407-415, In Spanish with English summary.

The international environmental organization Greenpeace has carried out in the summer 1986-87 its second antarctic expedition, erecting on Ross I. the first permanent non-governmental scientific base. The conviction that Antarctica's exceptional wildlife and environmental values are threatened by growing human intervention, overfishing, and the possibility of future mineral and oil exploitation is discussed and defended. The implementation of the already existing international conventions and agreements, and the declaration of Antarctica as a World Park are seen as the ways to protect Antarctica from further environmental damage. An active role of Spain in the Antarctic Treaty System is believed to be of great importance in achieving those goals. (Auth.)

A-36420
Santiago de Chile. Instituto Antártico Chileno, **Boletín antártico chileno, Vol.7, No.1,** Jan.-June 1987, 64p., In Spanish.

This bulletin reviews the following: atmospheric, biological, oceanographic, geological, ecological and geophysical activities of the 23rd INACH scientific expedition carried out Jan. 5-Mar. 6, 1987, on board the ship *Alcázar* and at the 3 Chilean antarctic stations, complete with tables showing field of investigation, title of project, participating institutions, goals, and location of research; the history of Chile's involvement with Antarctica through its expeditions, its antarctic stations, and its participation in the Antarctic Treaty; the legal and political considerations on which Chile's aspirations concerning its future in Antarctica are based; a study of the basins surrounding the Antarctic Peninsula, sponsored by the U.S. National Science Foundation, in which Chile is participating; the discovery of a mysterious protozoic creature dwelling in deep antarctic lakes; and current activities of some organizations, or individuals, interested in Antarctica. An INACH news synthesis covering the first 6 mos. of 1987 concludes the bulletin. For an article abstracted separately, see A-36421.

A-36421
Romero Julio, P., **International scientific cooperation in Antarctica** [Cooperación científica internacional en la Antártica], *Boletín Antártico Chileno,* Jan.-June 1987 7(1), p.18-26, In Spanish.

The history of international cooperation of scientists in antarctic research is reviewed, including the British, American, German, and Swedish expeditions in the 1800s and early 1900s, and Chile's own participation, through legal measures, conferences and scientific contributions, from the 1950s through today.

A-36450
Quilty, P., **Formulating the future,** *Australian natural history,* Summer 1986-87 22(3), p.116-118.

The possibilities for extracting antarctic natural resources are outlined. Major considerations include the development of fisheries, ice as a fresh water source, minerals, tourism, and research. Major roadblocks hindering the realization of some of these possibilities include the uncertainty of the annual stocks of krill and fish (in the case of fisheries development), and the 2,500 m thick ice sheet atop possible mineral deposits. A reinforced plastic wrapper about icebergs may be a possible alternative to towing. Other considerations include the need for the careful use of the fragile antarctic environment and the effects of human activities on Antarctica.

A-36472
Australia. Antarctic Division, **ANARE news no.49,** Kingston, Tasmania, 1987, 20p.

This issue includes, among others, items dealing with: establishment of bases at Commonwealth Bay and Larsemann Hills; new satellite communications system; survey of the South Magnetic Pole; heavy ice in the Bunger Hills region; glaciological surveys in Wilkes Land; SCAR panel on waste disposal; people, publications, and weather summaries for Nov. and Dec. 1986 and Jan. 1987 at Mawson, Casey, Davis, and Macquarie.

A-36473
Australia. Antarctic Division, **ANARE news no.50,** Kingston, Tasmania, 1987, 24p.

Among other topics, this issue includes reports discussing: a field visit to Scullin Monolith and summer operations at Larsemann Hills; Heard Island survey; marine science in Prydz Bay; antarctic meetings in Montevideo; antarctic environment committee meeting; the discovery of a new group of marine microoganisms from the Weddell Sea; underwater seal calls; botanical studies at Casey; ice core drilled at Law Dome; people and Antarctica, publications, and weather summaries for Feb., Mar., and Apr. 1987 at Mawson, Davis, Casey, and Macquarie.

A-36474

Australia. Antarctic Division, **ANARE news no.51,** Kingston, Tasmania, 1987, 16p.

Among the news items noted in this issue are: a reunion of a 1962 Australian traverse party which went from the coast to Vostok and return; participants in the 1987-88 science programs; authorization of the Antarctic Medal; environments at the Australian antarctic stations; marine and terrestrial biological studies; midwinter celebrations at the stations; dry run erection of a building scheduled for Davis; appointment of the 1988 station leaders; recent publications and the May, June, and July weather summaries at Mawson, Casey, Davis, and Macquarie.

A-36483

Levich, S.V., Fal'kovich, N.S., **Recreation and tourism in the southern ocean and Antarctica,** *Polar geography and geology,* Apr.-June 1987 11(2), p.94-102, Translation of Vsesoiuznoe geograficheskoe obshchestvo. Izvestiia 119(2):168-174, 1987. 25 refs.

This assessment of recreation and tourism in the southern ocean starts with a demarcation of the northern boundary of the ocean: in the authors' view it extends north to the southern coasts of South Africa, South America and Australia, and indeed, in the case of South Africa, even stretches north of 35S. Rather than subdividing the southern ocean into "oceanic" sectors, e.g., the Indian Ocean sector, the topic is presented in terms of 3 latitudinal zones: temperate, subantarctic and antarctic. The role of tourism is discussed in each of these zones. With regard to the antarctic zone, however, the discussion of the history of tourism, both shipborne and airborne, is quite detailed and supported by quantitative data. It is stressed that tourism is still in an embryonic stage in Antarctica, but that one should not be in a hurry to force the pace since even at its present rudimentary level, tourism has been having an adverse impact on the vulnerable ecosystems of the continent. (Auth.)

A-36485

Madrid. Consejo Superior de Investigaciones Científicas, **Report on activities of the Spanish Council on Scientific Research in Antarctica** [Informe sobre las actividades científicas del CSIC en la Antártida], Madrid, Consejo Superior de Investigaciones Científicas, 1987, 153p., In Spanish.

The seven parts of this volume following the introduction and containing an account of the activities of the Spanish Superior Council on Scientific Research in Antarctica include the following: details of the Magga Dan '66 expedition to Breid Bay Nov. 18, 1966-Apr. 24, 1967, covering biological and oceanographic investigations, with description of methods used and results obtained; details of a research project on terrestrial physics, tides, earth's crust and free oscillation, carried out Nov. 1983-Nov. 1984 at Amundsen-Scott Station; details of the *Antartic '85* cruise, basically a study of the dynamics and composition of antarctic waters, biomass, phytoplankton production and bacterial heterotrophic activity, carried out jointly with Argentina between Dec. 30, 1984, and Mar. 4, 1985, on board the *Almirante Irizar;* details of a chemical and taxonomic study of marine organisms carried out jointly with Chile between Dec. 21, 1985 and Jan. 3, 1986; details of the *Antartic '85* cruise, an oceanographic study carried out jointly with Poland between Sep. 23, 1986, and Jan. 10, 1987, in waters surrounding the South Shetland Is.; details of the expedition ANARE No.6, a study of sea birds carried out jointly with Australia between Jan. 9 and Feb. 19, 1987; and details of the Vulcantar Project carried out jointly with Argentina on Deception I. between Jan. 6 and Feb. 20, 1987, investigating electronic equipment for antarctic regions, and fumarolic and seismic activities. Results, conclusions and recommendations are given.

A-36487

U.S. National Science Board. Task Committee on NSF's Role in Polar Regions, **Role of the National Science Foundation in polar regions,** Washington, D.C., June 1987, 57p., NSB-87-128, Refs. passim.

This report was prepared on the basis of oral presentations and written background information from experts representing various fields of polar research and organizations concerned with such research. Included in the Committee review are scientific needs and opportunities in meteorology and climate, ocean sciences, earth sciences, glaciology, upper atmosphere research and astronomy, biology and ecology, medicine and health, behavioral and social sciences, and engineering. Consideration is given to the impact of international, national, and state policies and interests on the nature and conduct of polar research, as well as to implications of legal, environmental, and industrial concerns for polar science and engineering. Logistic requirements for effective U.S. research programs in the Arctic and the Antarctic are examined, as are trends in the financial support of polar research. Differences between the Arctic and the Antarctic influencing the conduct of research in these regions are examined. Specific recommendations are offered to assist the National Science Foundation in fulfilling its primary responsibility for polar science and to strengthen U.S. research and presence in the polar regions.

A-36494

Scientific Committee on Antarctic Research, **Report of the SCAR executive meeting, Grenoble, France, 1-3 July 1987,** *Polar record,* Sep. 1987 23(147), SCAR bulletin No.87, Sep. 1987, p.741-751.

The current activities and interests of several working groups are reported: biology, logistics, meteorology, upper atmosphere physics, geology and solid earth geophysics. Groups of specialists reported on climate research, sea ice, BIOMASS, and southern ocean ecology, Cenozoic paleoenvironments, antarctic lithosphere, and a proposal to form an antarctic environment group. Progress reports were discussed on waste disposal, environmental protection, and data management matters. SCAR is involved with a wide variety of other ICSU bodies. Programs of these groups are monitored as they might require antarctic contributions. SCAR program committee members and representatives to various international organizations are identified; the results of meetings and planned agendas or actions at meetings with these organizations are outlined.

A-36500

Chang, S.-K., **Natural environment and human activities in King George Island, West Antarctica,** *Korean Earth Science Society. Journal,* 1987 8(1), p.53-74, Refs. p.72-74.

Natural environment and human activities on King George I. are reviewed. It is found that man can live a normal life on the island, although the insufficiency of space and water resources might be a hampering factor to further human activities. The necessity to protect the natural environment from the effects of human activity on the island is pointed out. (Auth. mod.)

A-36523

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **New Zealand antarctic research programme 1986-87,** Christchurch, 1986, 22p.

A general description is given of the overall program, participating agencies, topics of special interest and emphasis, the number of personnel involved, and general areas where investigations will be performed. An introduction is made to the history of the New Zealand antarctic program, to the bases of operation, Scott Base and Vanda and Bird Stations, to the agencies having directorial respon-

sibilities for the programs, and to other points of historical and operational interest.

A-36524

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **New Zealand antarctic research programme 1987-88,** Christchurch, 1987, 25p.

A brief introduction is given to Antarctica and New Zealand's history of involvement there, the agencies conducting research, the responsible agency for overall management of the program, and the bases from which most of the work will be carried out: Scott Base, Arrival Heights, Vanda and Bird Stations. Other points of historical and operational interest are also noted. Individual programs are summarized and show the performing agency, program title and event number, a statement of the research to be accomplished, and the locations and period of the research.

A-36525

Bugaev, V.A., ed, **Antarctic. Committee reports No.11,** Washington, U.S. National Science Foundation, 1974, 560p., TT-74-53004, Numerous refs. passim. For Russian original and abstracts see 7B-12313, 7E-12304, 7E-12305, 7F-12307 through 7F-12309, 7F-12311, 7F-12312, 7H-12314 through 7H-12317, 7I-12310, 7K-12301 through 7K-12303, and 7L-12306, or 28-204 through 28-209.

This is a translation of a number of papers in various disciplines: atmospheric physics, including F2 layer ionization and geomagnetic disturbances; geomorphology of the continent and structural features of the southern ocean floor; glaciology and limnology; foraminiferal studies of Northern and Southern hemispheres; and studies of human physiology, psychology and morbidity at antarctic stations.

A-36526

19th SCAR meeting [XIX reunión del SCAR], *Antártida,* June 1987 No.15, p.4-6, In Spanish.

Activities of the 19th SCAR meeting, held in San Diego, CA, June 16-27, 1986, are reviewed, with emphasis on Argentina's participation in various decisions, such as the election of SCAR's president, vice-president and secretary, admission to SCAR of the People's Republic of China, a stand against the admission of Italy, the organization of an Ad-hoc Group on publications, and scheduling a meeting between Argentina, Chile, Peru, Uruguay and Brazil to coordinate their antarctic policies

A-36528

Ellsworth, *Antártida,* June 1987 No.15, p.18-29, In Spanish.

The biography of the American explorer Lincoln Ellsworth is summarized. His antarctic adventures, including the aborted expeditions and his successful first transantarctic flight, and landing on the Ross Sea shores on Dec. 5, 1935, are described in detail. His principal contribution to science was to geography and to cartography, by the sighting and naming of many previously unknown areas, and by taking innumerable aerial photographs which resulted in valuable amplification and perfectioning of antarctic maps, especially those of the eastern coastline of the Antarctic Peninsula.

A-36529

Discovery of Antarctica [Descubrimiento de la Antártida], *Antártida,* June 1987 No.15, p.32-49, In Spanish.

After a brief general review of early antarctic and subantarctic expeditions, a detailed account is given of the alleged first sighting of Antarctica, on Feb. 19, 1819, by Captain W. Smith, commander of the British ship *Williams,* and his subsequent exploratory navigation around the South Shetland Is. The antarctic adventures of T. Bellingshausen and N.B. Palmer, in 1819-1820, are described and the controversial issue as to which of the two actually discovered Palmer Land is discussed. American and Argentine participation in antarctic discovery and exploration through the sealing industry is reviewed, and copies of documents showing movements of ships between the port of Buenos Aires and Antarctica in 1819-1820 are presented.

A-36531

Science in Antarctica [Ciencia en la Antártida], *Antártida,* June 1987 No.15, p.58-63, In Spanish.

The four departments responsible for scientific and technical investigations carried out by the Instituto Antártico Argentino, founded in 1951, cover the fields of terrestrial physics, biology, atmospheric physics and logistics. Each of these departments realized, within its own specialization, investigations that cover all the disciplines of natural sciences, including aspects of medicine and human physiology. This article includes a broad outline of antarctic biological, oceanographic, geological, glaciological and upper-atmospheric studies in which Argentina participated over several decades.

A-36536

Sahrhage, D., **Protection of antarctic living marine resources** [Zum Schutz der lebenden Meeresschätze der Antarktis], *Hamburg. Bundesforschungsanstalt für Fischerei. Informationen für die Fischwirtschaft,* 1986 33(4), p.165-167, In German.

The meeting of the CCAMLR in Hobart, Tasmania, Sep. 8-19, 1986 is reported. Participants included representatives from 19 signatory nations of the CCAMLR plus representatives from six international organizations. Discussions centered on the status of fish species in the vicinity of Kerguelen, South Georgia, and the South Orkney Islands and the Antarctic Peninsula. Several options were presented designed to preserve the population stability of these fish. Krill resources and programs for monitoring the ecosystem were also discussed.

A-36540

Behrendt, J.C., Gryc, G., **Survey's polar meeting was triple anniversary,** *Geotimes,* Mar. 1984 29(3), p.10-11.

Activities of the U.S. Geological Survey's Polar Research Symposium, held in Oct. 1983 in Washington, D.C., are reviewed. Some of the papers presented are summarized. Topics ranged from assessment of energy and mineral resources to plate tectonics and the geologic evolution of both polar regions. The antarctic program covered a range of topics from the aeromagnetic work of J. Balsley in 1947 through the multichannel seismic reflection survey to be conducted in 1983-1984 austral summer by the research vessel *S.P. Lee.*

A-36550

Weller, G., Bentley, C.R., Elliot, D.H., Lanzerotti, L.J., Webber, P.J., **Laboratory Antarctica: research contributions to global problems,** *Science,* Dec. 4, 1987 238(4832), p.1361-1368, Numerous refs.

Research in Antarctica is becoming increasingly important in the large interdisciplinary studies of connections within the earth's geosphere-biosphere system. Four examples of broad research areas are discussed. Upper atmosphere research explores the sun-earth interactions, which are most intense in the polar regions. The mass balance and dynamics of the large antarctic ice sheet, and its paleoclimatic records recovered from deep ice cores, are important indicators of past and present global changes. Antarctica and sediment cores from the southern ocean contain the history of inception and growth of the ice masses and their subsequent fluctuations, and the long-term history of paleoclimate. The remarkable adaptations of antarctic biota to extreme cold and drought may allow, through biotic monitoring, the detection of changes in the ocean and climate Antarctica. (Auth.)

A-36553
New Zealand Antarctic Society, **Antarctic, Vol.11, No.5,** Christchurch, 1987, p.194-232.

Research projects of several countries, to be carried out during the summer season of 1987-1988 in Antarctica and the Subantarctic, are outlined. New Zealand's 30th continuous year of scientific activity in the Antarctic will involve 200 scientists and support staff working on 47 projects on and around Ross I., in McMurdo Sound and in the Dry Valleys region with one deep field geological mapping expedition to Marie Byrd Land and a 4-man expedition to Cape Hallet. Scientific studies will cover earth, life, atmospheric and physical sciences. ANARE plans 3 marine science cruises designed to allow for a survey of crabeater seals in Prydz Bay, and oceanographic work leading up to the World Ocean Circulation Experiment scheduled for 1990-1995. Other topics noted in this issue of the journal include: a summary of diverse programs successfully completed by the British Antarctic Survey in the 1986-1987 season; a major fossil find on Seymour I. by a joint U.S.-New Zealand party of 13 earth scientists; a new U.S. tanker's first voyage to Antarctica; South Korea's plans to start construction of a permanent scientific station on King George I.; the establishment of Fildes Station, operated by the Chilean Antarctic Institute, on King George I.; a penguin study on Campbell I.; the private British/Norwegian 90 Degree South Expedition's preliminary report of the journey retracing Amundsen's journey to the South Pole; an Antarctic Heritage Trust established in New Zealand to further the conservation and preservation of historic sites and artefacts in Antarctica; book review; and society news.

A-36557
National Research Council. Polar Research Board, **Report on United States antarctic research activities, February 1986-October 1987; United States antarctic research activities planned for October 1987-September 1988,** United States report to SCAR, No.29, Washington, D.C., National Academy Press, 1987, 107p., Bibliography p.68-97.

Details are outlined of the programs, the scientists involved both in Antarctica and at home bases, and the locations of the investigations. A broad spectrum of study programs ranges from aurora and airglow through cosmic radiation, meteorology, ozone, cartography, geophysics, glaciology, oceanography, biological and medical sciences to shipboard and information programs, among others.

A-36558
Oslo. Norsk Polarinstitutt, **Yearbook of the Norwegian Polar Research Institute, 1986** [Årbok 1986], Oslo, 1987, 40p.

Organizational structure, facilities, research programs, publications, meetings, and other details of the Norsk Polarinstitutt's activities are reported. Research pertinent to Antarctica included a projected 1987 Norwegian expedition to Peter Island with the main object of gathering data to construct a topographic map of this small island; geological investigations in Queen Maud Land; mapping the sea floor on the Weddell Sea shelf and upper slope; and study of tabular icebergs.

A-36562
Australia. Antarctic Division, **1986-87 Australian antarctic research program initial field reports,** Kingston, Tasmania, 1987, 228p.

Précis of 83 projects are included in this booklet in subject areas ranging from life sciences (37 reports), through physics and earth sciences (13 each), to glaciology (7). The remaining 13 reports are divided among environmental studies, human biology and medicine, mapping and surveying, meteorology, oceanography, and social sciences. A geographic index lists programs at the various Australian bases, including the name of the chief investigator and project title. A second list provides names and addresses of chief investigators.

A-36567
Montevideo. Instituto Antártico Uruguayo, **Antarctic Treaty. Uruguay's activities** [Tratado Antártico. Actividades de la República Oriental del Uruguay], Montevideo, 1987, 16p., In Spanish.

This is a national report to SCAR for the 1986-1987 antarctic activities required by Article VII (5) of the Antarctic Treaty. The following items are covered: a list of cargo-and-personnel-transportation ships (3 Soviet, 1 Argentine, 1 Chilean, 1 British), aircraft (3 Uruguayan), and other vehicles; the program of the Instituto Antártico Uruguayo, with summaries of penguin studies on Ardley I., water pollution in Fildes Bay, and the use of krill for human consumption; plans for meteorological observations· geological and cartographic investigations carried out at Artigas Station, Jan. 16-Mar. 4, 1987; and lists of personnel and meteorological, biological and communication equipment at the station.

A-36568
National Research Council. Polar Research Board, **Annual report 1986 and future plans,** Washington, D.C., National Academy Press, 1987, 60p.

This annual report describes the Polar Research Board, its origin and objectives, its work and plans, and its principal activities and accomplishments during calendar year 1986. An overview presents a concise summary of the various aspects of the Board's program and of its responsibilities as U.S. National Committee for the Scientific Committee on Antarctic Research (SCAR) of the International Council of Scientific Unions. This section serves as a guide to the more detailed information in the rest of the report. At the end of the report are lists of those who participated in the work of the board and its subgroups and of those who represented the United States in the activities of SCAR, based on membership as of Dec. 31, 1986. There are also lists of publications by the Board, reports issued during the past year, and those in preparation. (Auth.)

A-36569
Tasmanian Development Authority, Lawrence Howard & Associates, **Australian National Museum of Antarctica. Proposed development of a National Antarctic Museum in Hobart. Initial feasibility study,** Feb. 1987, 224p.

This initial feasibility study consists of 6 parts, the 2nd of which discusses Hobart's historic links with antarctic exploration and research, and the reasons for the great international interest in Antarctica. Conceptual design, visitor projections and planning parameters, collection possibilities, and the Sullivan Cove urban design study are appended in part 6. The other parts deal with background to the proposal, basic objectives, site selection and development strategy.

A-36584
Sahrhage, D., **Fisheries research in the Antarctic** [Fischereiforschung in der Antarktis], *Hamburg. Bundesforschungsanstalt für Fischerei. Informationen für die Fischwirtschaft,* 1986 33(3), p.112-113, In German. 1 ref.

A brief account is given of the activities of *Polarstern* conducting a fisheries survey in the vicinity of Elephant Island during the German ANT V/1 cruise of the region north and west of the Antarctic Peninsula, May-June 1986. The primary objectives were to measure krill distribution and survey various fish species in the area. Exchange scientists from Brazil, Denmark, the U.K., Netherlands, Spain, Uruguay, and the U.S. participated. Survey methods and results are given.

A-36720

Fukunishi, H., **Activities of the 26th JARE wintering party,** *Polar news,* Aug. 1986 No.43, p.17-22, In Japanese.

The activities of the 26th JARE wintering party at Showa and Mizuho stations in 1985 are briefly summarized. The main scientific activities are, 1) Map (Middle Atmosphere Program), 2) glaciological study of the dome area of the East Queen Maud Land, and 3) environmental monitoring of the area along the coast of the Lützow-Holm Bay. Ground-based, balloon and rocket observations were carried out at Showa Station for MAP. The traverse party for the glaciological study reached the top of the East Queen Maud Land dome (77 22'S, 39 36'E, 3807 m above sea level). Improved wintering life at Showa Station is also introduced. The topics in wintering life are a successful operation of color TV telephone between Showa Station and Japan, a daily newspaper published using a Japanese word processor, and a comfortable Japanese-style bathroom constructed in a new power station.

A-36725

Colacrai de T., M., **Antarctic environmental question: extreme positions from outside of the Antarctic System. (Greenpeace ecology group)** [La cuestión del medio ambiente antártico: Posiciones extremas desde fuera del sistema antártico. (El grupo ecologista Greenpeace)], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.336, 19p., In Spanish with English, French and German summaries. 8 refs.

After outlining activities of Greenpeace as a pressure group, an attempt is made to detect its aims and interests in relation to Antarctica. The Recommendations on environment contemplated by the Antarctic Treaty System are examined to evaluate the criticisms formulated by Greenpeace in ecological matters. It is concluded that, since the Consultative Parties have the primary responsibility for Antarctica, it becomes necessary to adopt uniform decisions regarding those criticisms. (Auth. mod.)

A-36734

Argentina. Dirección Nacional del Antártico, **Argentine antarctic research programmes, 1987-1990,** Buenos Aires, Instituto Antártico Argentino, 1987, 48p. + 49p., In English and Spanish.

After a brief geographical description of Antarctica, a list of Argentine antarctic stations—comprising 6 permanently active, 6 intermittently active, and 3 inactive bases—a historical synthesis of Argentine scientific activities in Antarctica, and individual outlines of about 50 current and future research projects are offered.

A-36735

Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos, **Boletim, No.11,** July 1987, 19p., In Portuguese.

The bulletin presents the program and a list of participants and contributing scientists and organizations of a seminar on Antarctica held May 19-21, 1987, in Brazil. Also included are 4 short papers presented at the seminar. For the latter, see G-36736, G-36737, H-36738, and I-36739.

A-36795

Giret, A., **Antarctica: the richest continent?** [Antarctique: le plus riche des continents?], *Science et vie,* Nov. 1987 No.842, p.34-44, 172, In French.

The geographic setting of Antarctica, its geological history, physical and chemical characteristics of its rocks and waters, are reviewed in the light of the interest of the international community in the economic development of the continent. Based on the theory that Antarctica was once at the center of Gondwanaland, attention is drawn to the mineral potentials in the continental crust, especially as evidenced by the abundance of iron in East Antarctica. Deposits of copper, nickel, chromium, cobalt and other mineral substances are reviewed, as are the dangers of exploration, and prospecting costs involved.

A-36812

New Zealand Antarctic Society, **Antarctic, Vol.11, No.2/3,** Christchurch, 1986, p.53-140.

Brief summaries are given of progress made in research projects conducted by teams of scientists from New Zealand, Australia, United Kingdom, Soviet Union, and the United States. Among the five nations, projects include investigations on penguins and fish, dry valley geology, ozone, Ross Sea drilling, ice thickness, Heard Island geology, marine science, cosmic rays, antarctic fleas, offshore biology, geophysics, logistics, ice shelf sediments and mass balance, meteorites, volcanic activity on Mount Erebus, and the antarctic food web. Other articles tell of a new research vessel being built for the Soviet Union and the operation in progress for the salvage of an NSF C-130 Hercules. Private expeditions in great variety are also briefly reported along with some historical reminiscences and service awards.

A-36813

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic operations manual,** Christchurch, 1987, 58p.

Administrative policies and procedures as practiced at the New Zealand antarctic bases are described. Specific topics treated include statutory regulations, official and personal information, travel to and from Antarctica, fire emergency actions, safety code, waste disposal, conservation, sites of special scientific interest, historic monuments, tourism and private expeditions, and international relations.

A-36832

U.S. National Science Foundation, **Antarctic journal of the United States, Vol.21, No.4,** Washington, D.C., 1986, 23p., For selected papers see B-36833, B-36836, G-36834 and J-36835.

In addition to papers on terrestrial biology, the South Pole facility, sea water at McMurdo, and a whale survey, the issue includes a pictorial essay on the South Pole; announcements of the publication of a tectonic map of the Scotia Arc, Vol.14 of the Antarctic Bibliography, and Vol.43 of the Antarctic Research Series; announcements of staff changes at DPP and funding awards for antarctic projects, July to Sep. 30, 1986; obituaries of Paul C. Daniels, John T. Crowell, and Merle Dawson; and weather summaries for Aug, Sep, and Oct 1986 at McMurdo, Palmer, Siple, and South Pole Stations.

A-36887

Hudson, D., ed, **Operation "Deep Freeze" W/O 87,** Marceline, MO, Walsworth Publishing Company, [1987], 88p. + color photos.

This pictorial account shows members of the wintering party at their job sites, relaxing at the library, romping in the snow, enduring the darkness, looking for the light, communing with seals, programming the local radio station, happy, sad, smiling, grim-faced, surprised, at ease, dressed up on occasion but oftener in comfortable working togs, and running the gamut of the 1000 and one other variations of mood, expression, garb, work, and play that are the life of the McMurdo Winter Cruise 87.

A-36893

Kingwell, J., **Antarctica and space,** *Search,* May-June 1987 18(3), p.126-127, 3 refs.

Three reasons for what makes satellites such effective tools for scientific investigation and management of Antarctica are discussed:

the great size, isolation and inhospitality of the continent; the nature of the orbits commonly used for observation of Earth from space; and the ability of new kinds of satellite-borne instruments to measure the physical nature and extent of ice fields and to detect features beneath the ice surface in cloudy conditions or in darkness. The planning of satellite systems in Canada and Europe is announced, and details are given.

A-36949

Teshebaev, Sh.B., Puntus, V.A., Biziuk, A.P., **Hygienic, architectural and psychological aspects of improved living conditions in Antarctica** [Gigienicheskie, arkhitekturno-stroitel'nye i psikhologicheskie aspekty sovershenstvovaniia zhilishcha v usloviiakh Antarktidy], *Antarktika; doklady komissii,* 1987 No.26, p.191-198, In Russian. Refs. p.197-198.

Basic principles of planning and construction in Antarctica, with consideration of climatic, sanitary and psycho-social hardships, are summarized. The evolution of building types and materials used in the last 90 years for housing and research facilities at antarctic stations, and their drawbacks and improvements, are reviewed.

A-36975

Berkowitz, E.A., **Frozen in place: American policy and practice in Antarctica,** Cambridge, England, Cambridge University, 1986, 89p., Refs. p.80-85., Thesis for Master of Philosophy.

After the Antarctic Treaty entered into force, the United States Antarctic Program grew from an unstructured beginning and developed into an entrenched bureaucracy. The bureaucracy evolved its own interests, not all of which were consistent with national interests. As a result, a program with exemplary capacity struggled against internal squabbling, waste and inefficiency, leaving a gap between performance and potential. The Introduction overviews current American interests and policies in the Antarctic. Chapter 1 traces the history of America in Antarctica until 1961, when the Antarctic Treaty came into force. Chapter 2 describes the development and operations of the U.S. Antarctic Program. Chapter 3 dissects the connection between policies and issues. The Conclusion offers a diagnosis and prescription. (Auth.)

A-36996

Mear, R., Swan, R., **Walk to the Pole: to the heart of Antarctica in the footsteps of Scott,** New York, Crown, 1987, 306p., 20 refs.

An account is given of the "In the footsteps of Scott" private expedition to Antarctica, which reached the South Pole, on foot, on Jan. 11, 1986. Appendixes include the expedition's meteorological and daily logs, the meteorological register of Scott's polar party, a list of equipment and provisions for the polar walk, physiological report (H-36997), psychological profiles of the 5 participants, and a list of supporters and sponsors.

A-36998

Sovetskaia antarkticheskaia ekspeditsiia, Kornilov, N.A., ed, Kozlovskiĭ, A.M., ed, Leont'ev, E.B., ed, **Twenty-fifth Soviet Antarctic Expedition. Studies of the 1979/80 season** [Dvadtsat' piataia Sovetskaia antarkticheskaia ekspeditsiia. Sezonnye issledovaniia 1979/80 g.], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1984 Vol.79, 127p., In Russian. Refs. passim. For individual papers see B-36999, B-37000, H-37004, and I-37001 through I-37003.

This volume contains information on observations and results of scientific efforts carried out by the 25th Soviet Antarctic Expedition in 1979-1980 season on the antarctic continent and surrounding waters. Seasonal activities and organization of the expedition, including logistic support and contact with non-Soviet expeditions, are outlined in the first part of the book. The second part consists of 6 individual papers giving the scientific results of projects in biology, meteorology, and studies on human adaptation to antarctic conditions.

A-37023

Wilkniss, P., **Why U.S. needs polar research vessels,** *Geotimes,* July 1987 32(7), p.4.

The U.S. has a long-term commitment to be an active and influential participant in antarctic affairs. Part of that participation should include a strong fleet of icebreakers or ice-going vessels. Presently, other nations are putting more effort into year-round antarctic research using ships as bases for their investigations. The U.S. does not now have that capability and needs to reverse that trend in order to meet its antarctic commitments.

A-37048

Davis, B.W., **Role of social scientists in Australian antarctic research,** *Search,* Aug./Sep. 1983 14(7-8), p.197-201, Refs. p.200-201.

The position is taken that since issues of political jurisdiction and the conservation or development of antarctic resources are essentially human problems, a growing need in Antarctica for social scientists skilled in dealing with matters relating to policy analysis, administrative organization, law, economics, geography and sociology should be recognized. Additional emphasis is put on the need for research alliance between the natural and social scientists, so that both groups play a significant role in determining the future of Antarctica.

A-37065

Shamont'ev, V.A., **Winter operations of the 26th Soviet Antarctic Expedition** [Zimovochnye raboty Dvadtsat' shestoĭ sovetskoĭ antarkticheskoĭ ekspeditsii], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.28-35, In Russian.

The winter activities of the 26th Soviet Antarctic Expedition are described, including the following tasks: continuation of research projects at Soviet stations, covering complex aerometeorological, geophysical, glaciological, geodetic, biological, and medical investigations; gathering of hydrological and meteorological data for fishing and sea, air, and snow transportation uses; automation of aerometeorological data; readying of snow-ice airfields at Molodezhnaya and Novolazarevskaya stations; construction of laboratories and installation of equipment on Molodezhnaya Station; supply operations on Vostok Station; and organization of a temporary, seasonal sub-base at Komsomol'skaya Station.

A-37078

Aver'ianov, V.G., **Forum of antarctic scientists** [Forum issledovateleĭ Antarktiki], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.99-108, In Russian.

The 18th SCAR session, held Sep. 24-Oct. 5, 1984, in Bremerhaven, F.R.G., is reviewed. Details are given regarding names of organizations and individuals, nationality, activities and recommendations of many working groups, workshops, and sub-committees participating in the forum. Five symposia to be held in the next 4 years—on antarctic conservation, meteorology, glaciology, terrestrial physics and biology, respectively—are listed. The date for SCAR's 19th session is given as July-Aug., 1986. Based on reports presented at the symposium, the growing interest in Antarctica by the international community is pointed out.

A-37081
Headland, R.K., **South Georgia: a bibliography,** Cambridge, British Antarctic Survey, 1982, 180p.

This bibliography on South Georgia includes much expeditionary, whaling and scientific material. It lists 1344 relevant items which are comprised of 1288 published works, 26 theses, 12 bibliographies and 18 serial publications. The entries are arranged in 3 series; a general list, a list of bibliographies and a list of relevant serial publications. These are arranged alphabetically by the name of the author, or first author where there are more than one, and thence chronologically, with alphabetical characters inserted where this produces identical forms. Items published up to late 1981 are included, together with a few dated 1982. A chronological distribution for the century 1882-1981 was prepared and is appended. (Auth.)

A-37087
Gvozdetskiĭ, N.A., Golubchikov, IU.N., **Mountains** [Gory], Moscow, Mysl', 1987, 399p. (pertinent p.367-370), In Russian. Refs. p.379-390.

Geological, tectonic, geomorphological, climatic, glaciological and hydrological properties of mountain systems around the world are reviewed. Ch. 13 deals, specifically, with such systems in Antarctica; some ecological considerations on hardships to which living organisms are exposed in Antarctica, and on difficulties involved in exploiting possible resources, are given.

A-37131
Viglione de Arrastía, H., Belfiore de Carrara, M., Capdevilla, R., **Bibiographic review of contributions on antarctic history presented at national historical congresses** [Sintesis bibliografica de aportes sobre el pasado antártico realizados en congresos nacionales de historia], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.343, 22p., In Spanish with English, German and French summaries.

Thirty-four works dealing with antarctic historical research are included in this contribution; they were presented at 4 national congresses convened by the Academia Nacional de la Historia and at 5 meetings promoted by the Instituto de Investigaciones Históricas Tierra del Fuego. In this way, information dispersed in different publications and in unpublished material, is brought together. A compilation of all the works with their complete text is located in the library of the Dirección Nacional del Antártico. (Auth.)

A-37136
Joyner, C.C., **Comparison of Soviet arctic and antarctic policies,** *Woods Hole Oceanographic Institution. Technical report,* Jan. 1988 WHOI-88-5, p.22-23, Extended abstract.

The Soviet Union is a polar State with multiple polar interests which apply not only to the Arctic, but also to the Antarctic. This paper examines three issues which lend insight into the Soviet Government's perception of its national interest priorities for the respective poles, the policies formulated to attain those priorities, and the geostrategic importance which has been affixed to them: the legal attitude towards territorial claims and sovereignty considerations, the promotion of scientific activities, and the managing and exploitation of resources. Differences between Soviet policies related to the Arctic and the Antarctic, respectively, are pointed out in relation to each of the three issues.

A-37185
Skrotzky, N., **Far lands: the great polar adventure** [Terres extrêmes: la grande aventure des Pôles], Paris, Denoël, 1986, 228p., In French. Refs. p.215-216.
DLC G587.S57 1986

The 7 chapters and 4 annexes of the book are dedicated, mainly, to recalling the most important accomplishments of exploration and research in both polar regions, and the men who carried them out. Climatological, oceanographic, atmospheric and biological features of the polar regions are also considered.

A-37196
New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Dry Valleys bibliography: supplement to vol.2,** [1986], 12p.

Most of the citations in this collection cluster in the time period 1984, 1985, and 1986 with a few reaching back to the 1981-1982 period. They are classed in categories which include biology, geochemistry, geology, geophysics, glaciology, hydrology, limnology, microbiology, and pedology. This list appears to be a supplement to vol.2 of the *Bibliography of international dry valley publications, 1978-1984* (14A-31726).

A-37199
Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos, **Boletim, No.9,** Sep. 1986, 20p., In Portuguese.

This bulletin presents some questions and answers—concerning construction in Antarctica, human adaptation, and algal acclimatization to antarctic conditions—addressed at the International Symposium on Antarctic Geosciences, held in Petrobrás in Aug. 1985; a financial report dated June 30, 1986; a brief review of the institute's history; and an article on biomedical aspects of antarctic research. For the latter see B-37200.

A-37202
Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos, **Boletim, No.10,** Apr. 1987, 32p., In Portuguese.

This bulletin summarizes activities carried out at various meetings concerning IBEA's administrative structure and the institute's current plans. It also presents a financial report; brief news items on Antarctica, such as the inclusion of Brazil and other nations as consultative members in the Antarctic Treaty; and 3 articles on computers and data processing, in relation to science and technology, nuclear energy, and scientific research, respectively. For these articles, see A-37203 through A-37205.

A-37203
Pinto Coelho, A., **Informatics in science and technology** [Informática em ciencia e tecnologia], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Apr. 1987 No.10, p.2-7, In Portuguese. 12 refs.

With the object of promoting the introduction of a computer system in IBEA, a review of data processing methods is presented, beginning with the human mind and continuing with a history of the gradual development of more and more sophisticated means of communication and information storage and retrieval systems and equipment. A plan for the utilization of the new system at IBEA is outlined.

A-37204
Carvalho de Souza, A., **Informatics in nuclear energy** [Informática em energia nuclear], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Apr. 1987 No.10, p.8-16, In Portuguese.

After defining the concept of "informatics" a description of its role in science and technology, of scientific data processing, of its applicability to engineering and construction projects, and of data centers is given. Also described is the Nuclear Information Center (CIN), an organ of of the National Commission of Nuclear Energy in operation since 1970 and representing Brazil in the International Nu-

clear Information System, of the International Atomic Energy Agency. An appeal is made to employ CIN in the processing of antarctic data, citing as example the American database COLD. Some considerations of the future of computer systems in science and technology include a summary of advances in the hardware and software areas.

A-37205
Fontana, P., Jr., **Scientific research and computer system theory** [Pesquisa científica e teoria da informática], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Apr. 1987 No.10, p.17-20, In Portuguese. 10 refs.

After stating that scientific research progresses through observation, conceptualization and organization of facts, fundamental types of questions and answers leading to such progress are examined. Models showing the relationship between questions and information, and the use of information in, among others, antarctic scientific research, are presented.

A-37206
Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos, **Boletim, No.12,** Sep. 1987, 20p., In Portuguese.

This bulletin presents a list of IBEA's members and a financial report. It also includes: a brief note on the inauguration ceremony of IBEA's new President; news items relating to 2 instances of radio communication between Brazil and Antarctica; an outline of IBEA's activities to promote Brazil's involvement in Antarctica; and 2 articles on Brazilian antarctic research. For the latter, see A-37207 and E-37208.

A-37207
Pinto Coelho, A., **The Presidency: the only way** [A presidencia: o único meio], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Sep. 1987 No.12, p.2-8, In Portuguese.

After listing a variety of studies carried out in Antarctica by 19 consultative nations, the usefulness of the Antarctic Treaty is discussed, and the need for Brazil to join other South American countries in a rational exploitation of antarctic resources is emphasized. IBEA's efforts during the last 3 1/2 years in promoting Brazil's involvement in Antarctica are enumerated.

A-37232
Fernholm, B., **Krill conventions** [Krill konventionen], *Fauna och flora,* Oct. 1987 No.4, p.174-177, In Swedish.

A review is presented of the interest of the international community in antarctic mineral and marine living resources, with information on CCAMLR meetings and data on fish and krill exploitation.

A-37237
Matzenbacher, L.O., **Antarctica: adventure and reality on the threatened continent** [Antártida: aventura e realidade no continente ameaçado], Porto Alegre, L&PM, 1986, 120p., In Portuguese.

A narrative composed from personal experience is presented, written by a Brazilian reporter who, in 1986, took part in an expedition on board the research vessel *Professor Vladimir Besnard* bound to Antarctica. Climate, ecology, international cooperation, living and working conditions in Antarctica are described, and some geopolitical issues are raised in defense of territorial claims to Antarctica by Latin American countries on grounds of geographic proximity.

A-37242
Santiago de Chile. Instituto Antártico Chileno, **Boletín antártico chileno, Vol.7, No.2,** July-Dec. 1987, 76p., In Spanish. Refs. passim. For selected articles, see B-37243 and I-37244.

This bulletin reviews the following: the 1987 Antarctic Week, organized by INACH and held in Antofagasta Nov. 2-6, 1987; the ceremony commemorating the 25th anniversary of the National Committee of Antarctic Research; reports of seminars and national and international conferences dealing with antarctic marine living resources, logistics, ecology, oceanography, geology, glaciology, geopolitics, and geophysica; INACH's activities oriented toward the dissemination of information on Antarctica and Chile's territorial claims on same; and brief news items concerning organizations and individuals interested in Antarctica. An INACH news synthesis covering the last 7 mos. of 1987 concludes the bulletin.

A-37264
McAdam, J.H., **Contribution of settlement schools to pasture improvement studies in the Falkland Islands,** *Agricultural progress,* 1987 Vol.62, p.97-104, 10 refs.

A simple experiment involving seeds, fertilizers and basic meteorological apparatus was distributed as a package to settlement schools in 1977. The agronomic value and educational merit of the resulting investigation are discussed. The climatic information obtained from weather recordings confirmed that the drier areas were located in the southern part of the archipelago, while those with higher rainfall occurred in the north and were generally situated immediately north and east of high ground. Temperatures increased toward the west and south of the islands. (Auth. mod.)

A-37294
McGowan, A., **Historical archaeology at Cape Denison, Commonwealth Bay, Antarctica,** *Polar record,* Apr. 1988 24(149), p.101-110, 20 refs.

Archaeological investigations formed part of the conservation work of Project Blizzard in 1985-86 at the site of Mawson's Australasian Antarctic Expedition (1911-14) huts, Cape Denison, Commonwealth Bay. The extent and nature of the archaeological resources are described, and the results of excavations inside the main hut in 1985 are summarized. Excavation stratigraphy is interpreted in the light of the documented post-abandonment history of the site, and used to measure the extent to which human activity inside the hut may be contributing to its deterioration. (Auth.)

A-37296
Erskine, A.B., **1903 Swedish expedition hut on Paulet Island, Antarctica,** *Polar record,* Apr. 1988 24(149), p.133-134, 1 ref.

A brief account is given of a tour group going ashore on Paulet I. and finding the remnants of the stone hut built by a Swedish expedition whose ship was crushed by ice and sank in the Weddell Sea in Feb. 1903. The layout seems undisturbed except from natural causes.

A-37297
Scientific Committee on Antarctic Research, **Recommendations from the 14th Antarctic Treaty Consultative Meeting, Rio de Janeiro 1-16 October 1987,** *Polar record,* Apr. 1988 24(149), SCAR bulletin No.89, April 1988, p.173-191.

The representatives produced ten recommendations to their governments along with guidelines, annexes, management plans, and information lists. The recommendations cover: public availability of consultative meetings documents; need and requirements for environ-

mental impact assessments; safeguards for scientific drilling; expiry date for Site of Special Scientific Interest No.2 extended to Dec. 13, 1997; management plans for SSSI Nos.22 through 28; circumstances for establishing marine SsSSI; improving communication links for antarctic meteorological data; monoliths and plaques commemorating the rescue of survivors from Shackleton's ship *Endurance* by the Chilean Navy cutter *Yelcho;* improvement of air safety procedures; improving or developing marine meteorological and sea ice information services in the Treaty area.

A-37408

Australia. Antarctic Science Advisory Committee, **Report of Australia's antarctic science program,** Canberra, 1988, 140p., 26 refs.

The report provides an overview of the direction and scope recommended for Australia's science research in Antarctica along with the responsibilities and challenges which accompany such a program. The committee was formed in 1985 and consulted with a wide range of individuals and organizations on Australia's scientific policies and interests in Australian Antarctic Territory. The report represents the results of two years of such consultations and discussions. Seven key areas of research defined in individual chapters include: management of the living marine resources of the southern ocean; management of the environment and mineral resources; impact of human activities on the environment; effect of Antarctica on global weather and climate; social science to advance national interests; advancing understanding of physical, chemical, and biological processes; advancing all kinds of technology required to support research programs; and development of greater national and international awareness of Australia's antarctic program. Some 32 recommendations are made throughout the specifics of the program.

A-37482

Yoshida, Y., **Activities of the summer party of the 27th Japanese Antarctic Research Expedition in 1985-1986,** *Antarctic record,* Nov. 1987 31(3), p.186-205, In Japanese with English summary.

After rescuing *Nella Dan* from fast ice off the NW coast of Enderby Land, *Shirase* delivered cargo and personnel to Breid Bay and Showa Station, remained on station while construction work was done, then returned to Tokyo via Breid Bay to pick up returning personnel. The following scientific activities were conducted during the summer operation of the JARE-27: a) Field work; 1) geological, geomorphological, and geodetic observations in the central part of the Sör Rondane Mountains, 2) terrestrial biological investigations on the Sôya Coast, 3) gravimetric survey and geomorphological field work on the Sôya Coast; b) Shipboard activities; 1) marine biological research in and near the pack ice zone as part of the International Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS) program, 2) routine oceanographic observations, 3) sea gravity measurements, 4) ionospheric observations. (Auth. mod.)

A-37486

Miller, D., **Who has the right of exploitation, and the right to prevent exploitation, of the minerals in Antarctica,** Seventy-ninth Annual Meeting of the American Society of International Law, New York, Apr. 25-27, 1985. Proceedings, [1988], p.58-73.

Remarks by the Chairman of a panel, together with those of 4 other participants are presented, as is the discussion following the presentations. The meeting's objective was to examine the possibility of someone's attempt to develop and exploit antarctic resources, a new factor which constitutes a potential threat to the stability of the political and legal regime established by the Antarctic Treaty. Negotiations by the treaty parties for a minerals regime, and their motives, are reviewed. The legal, economic and ecological particulars of the regime currently under negotiations are analyzed to determine the degree of their adequacy to protect the environment. Discussion then covers the advantages and disadvantages of a U.N. regime regarding environmental security, with the conclusion that an international regime could be worse than the existing treaty system.

A-37489

Richards, R., **Maritime fur trade: sealers and other residents on St. Paul and Amsterdam islands. Pts. 1 and 2,** *Great circle,* Apr., Oct. 1984 6(1, 2), p.24-42, 93-109, 115 refs.

DLC VK15.G67

In the first of these two pts., the fragmented records of sealing activities on St. Paul and Amsterdam islands are reviewed, chronologically, from 1789 to 1809. The second pt. deals with the period 1810-1860, reviewing the trading, fishing, sealing and whaling voyages to and from the islands by, mainly, Dutch, British, American, and French vessels. The point is stressed that these islands have a long history of settlement and despoliation by man, and his introduced plants and animals, interfering with the islands' original ecosystem.

A-37490

Jones, A.G.E., **British sealing on New South Shetland, 1819-1826. Pts. 1 and 2,** *Great circle,* Apr., Oct. 1985 7(1, 2), p.9-22, 74-87, 108 refs.

DLC VK15.G67

A detailed description of activities between 1819 and 1826, which led to the extermination of fur seals on South Shetland Is, is presented. Fragmented records cited include information on the voyages on numerous fishing vessels, the yearly number of seal skins imported into Britain from all southern sources between 1815 and 1823, the profit and loss figures from the seal skin trade with the estimated yearly gross value chart for 1819-1825 seasons, and the London seal skin and oil prices for 1821 to 1826.

A-37491

Jones, A.G.E., **John Balleny and Amsterdam Island,** *Great circle,* Oct. 1986 8(2), p.73-77, 9 refs.

DLC VK15.G67

Excerpts from the journal and log book of John Balleny, master of the schooner *Eliza Scott* sent by merchants in oil trade to find new land or seas in the Antarctic, are presented. Included are details of Balleny's course and his sketches of Amsterdam I. as seen from his position on Nov. 4, 1838.

A-37506

Sun, M., **Antarctica pact could open way for mining,** *Science,* June 17, 1988 240(4859), p.1612.

A brief look is given at the antarctic minerals regime pact which was agreed to on June 2, 1988. The convention is now returned for ratification to the 20 nations who are consultative parties to the Antarctic Treaty; 16 of those nations must ratify the pact in order for it to take effect. Comments by three members of the U.S. negotiating team and a representative from a coalition of environmental groups are included.

A-37511

National Research Council. Polar Research Board, **Polar Research Board annual report 1987 and future plans,** Washington, D.C., National Academy Press, 1988, 56p., Publications list p.50-56.

This annual report describes the Polar Research Board, its origin and objectives, its work and plans, and its principal activities and accomplishments during calendar year 1987. The Overview presents a concise summary of the various aspects of the Board's program and of its responsibilities as U.S. National Committee for the Scientific Committee on Antarctic Research (SCAR) of the International Coun-

cil of Scientific Unions. This section serves as a guide to the more detailed information in the rest of the report. The second and third sections, "Arctic Activities" and "Antarctic Activities," describe the Board's activities in each region in detail. The fourth and final section outlines the work of the Board's subgroups, including the Board's *Strategy* studies and the activities of the Board's standing committees. At the end of the report are lists of those who participated in the work of the Board and its subgroups and of those who represented the United States in the activities of SCAR representing membership during 1987. There are also lists of publications by the Board, reports issued during the past year, and those in preparation.

B. BIOLOGICAL SCIENCES

B-34661
Wägele, J.-W., **Polymorphism and distribution of *Ceratoserolis trilobitoides* (Eights, 1833) (Crustacea, Isopoda) in the Weddell Sea and synonymy with *C. cornuta* (Studer, 1879),** *Polar biology,* Oct. 1986 6(3), p.127-137, 28 refs.

A rich collection of *Ceratoserolis trilobitoides* from the Antarctic Peninsula and the western and southern Weddell Sea is evaluated to describe the polymorphism and variations of the pigmentation. The species is very variable, though local populations show a relatively homogenous morphology. Transitional forms connect different morphotypes. Presumably the relative immobility of these animals, together with low fecundity and geographical or hydrographical barriers are responsible for the evolution of local races. *C. cornuta* and the "color-species" of Cals (1977) are synonymized with *C. trilobitoides.* (Auth.)

B-34662
Zamorano, J.H., Duarte, W.E., Moreno, C.A., **Predation upon *Laternula elliptica* (Bivalvia, Anatinidae): a field manipulation in South Bay, Antarctica,** *Polar biology,* Oct. 1986 6(3), p.139-143, Refs. p.142-143.

This paper examines experimentally both burying rates and predation upon unburied *Laternula elliptica* in the field at South Bay. Species and number of predators and burying rates were estimated during 23 days. Within the first 24 h, 30% of the bivalves buried themselves, after which, rates fell abruptly. By the end of the day 23, only 60% had successfully buried; of the 40% which remained unburied, 20% were consumed by the following sequence of predators: *Odontaster validus, Cryptasterias turqueti, Parborlasia corrugatus, Neobuccinum eatoni* and two species of amphipods. The 20% that remained unburied constituted potential prey though they showed no signs of being attacked by *O. validus* during the observation period. (Auth. mod.)

B-34663
Bodungen, B. von, **Phytoplankton growth and krill grazing during spring in the Bransfield Strait, Antarctica. Implications from sediment trap collection,** *Polar biology,* Oct. 1986 6(3), p.153-160, Refs. p.159-160.

Phytoplankton primary production, biomass, species composition and sedimentation of organic matter (using a moored and a free drifting sediment trap) were measured in eastern Bransfield Strait during spring 1983. Biomass and primary production increased from low levels in late Nov. to bloom levels by the end of Dec. The moored trap was deployed at 323 m depth for 22.5 days, and collected 2968 mg C and 67.6 mg chlorophyll *a* and derivatives per sq m, of which 90% was in the form of krill faeces. These figures are regarded as egestion of krill, and using ingestion:egestion ratios from the literature, grazing loss of phytoplankton by krill was estimated at 45% of the primary production during a period of 3 weeks. Large-scale surveys of phytoplankton standing stock indicate that the build-up of blooms during spring is apparently not controlled by krill grazing. (Auth. mod.)

B-34664
Kopczynska, E.E., Weber, L.H., El-Sayed, S.Z., **Phytoplankton species composition and abundance in the Indian sector of the Antarctic Ocean,** *Polar biology,* Oct. 1986 6(3), p.161-169, Refs. p.168-169.

Water samples collected in the southwestern Indian Ocean between Africa and Antarctica in Mar. 1980 were analyzed quantitatively for phytoplankton. Diatoms dominate the phytoplankton in this region and their numbers generally increase southward with peaks of abundance in both the northern Antarctic Zone and south of the Antarctic Divergence. Dinoflagellates, flagellates and "monads" occur in highest concentrations north of the Polar Front. Their numbers are somewhat reduced south of the Antarctic Divergence, and are lowest in the Antarctic Zone. Striking differences are noted between the species compositions of quantitative and net-haul samples. A few nanoplanktonic diatoms and the weakly silicified *Dactyliosolen tenuijunctus,* which are dominant in the quantitative samples, are neither entirely absent or present only as solitary cells in the net collections. (Auth. mod.)

B-34665
Slattery, P.N., Oliver, J.S., **Scavenging and other feeding habits of lysianassid amphipods *(Orchomene* spp.) from McMurdo Sound, Antarctica,** *Polar biology,* Oct. 1986 6(3), p.171-177, Refs. p.176-177.

Orchomene plebs lives primarily in deep water (>100 m); it is common in shallow areas (<100 m) only under the Ross Ice Shelf and along the western McMurdo Sound. Here Weddell seals frequent tidal cracks in which they discard carrion and defecate; otherwise food is scarce. *Orchomene pinguides* lives on shallow (<10 m) wave-cut benches that are rich in food along the eastern McMurdo Sound. *Orchomene plebs* is larger and more motile, and came to laboratory carrion and baited field traps more rapidly and in greater numbers than *O. pinguides.* The crop contents of *O. plebs* contained only amorphous organic matter that suggested a scavenging habit. Crops of *O. pinguides* contained not only amorphous organic matter but also invertebrate prey, especially planktonic copepods that impact the bottom during winter. (Auth. mod.)

B-34666
Sömme, L., **Ecology of *Cryptopygus sverdrupi* (Insecta: Collembola) from Dronning Maud Land, Antarctica,** *Polar biology,* Oct. 1986 6(3), p.179-184, 16 refs.

Observations on the ecology of *Cryptopygus sverdrupi* Lawrence (Collembola, Isotomidae) on specimens from Queen Maud Land are discussed. At an elevation of 1600 m a.s.l. the species was numerous in association with the green alga *Prasiola* on gravel fields and in crevices of large boulders. · The distribution of size-classes in field samples suggested that the population comprised several overlapping generations. Specimens collected in mid-Jan. had a mean supercooling point of -24.6 C with small individual variations. The lack of high supercooling points in the summer suggests that the springtails feed on a nucleator-free diet. The ability to supercool was increased during prolonged starvation and acclimation at 0, -4 and -8 C. Glycerol and other potential low molecular weight cryoprotective substances were demonstrated in specimens acclimated at -4 and -8 C. The species possessed a relatively high tolerance to desiccation. (Auth. mod.)

B-34667
Green, K., **Observations on the food of the South Polar Skua, *Catharacta maccormicki* near Davis, Antarctica,** *Polar biology,* Oct. 1986 6(3), p.185-186, 4 refs.

Regurgitated boluses of undigested material were examined from 6 sites in East Antarctica. Skuas nesting near Adelie penguin, south-

ern fulmar and antarctic petrel colonies showed greater site fidelity in their feeding than did skuas nesting close to cape petrels or a Weddell seal pupping site. (Auth.)

B-34668

Green, K., **Food of the Emperor Penguin *Aptenodytes forsteri* on the antarctic fast ice edge in late winter and early spring,** *Polar biology,* Oct. 1986 6(3), p.187-188, 9 refs.

The food of emperor penguins *Aptenodytes forsteri* at the edge of the sea ice off the Vestfold Hills was studied by faecal analysis. Fish, crustacean, cephalopod and gastropod remains were found in 151 droppings collected between Aug. and Oct. 1984. The main fish identified from otoliths was *Pleuragramma antarcticum* with an average standard length of 129.5 mm. Amphipods increased in frequency from Aug. to Oct. with gammarids predominating. (Auth.)

B-34680

Shust, K.V., **Basic principles of fish productivity in the neritic zone of the Atlantic sector of the Antarctic** [Osnovnye zakonomernosti formirovaniia ryboproduktivnosti neriticheskoĭ zony atlanticheskogo sektora Antarktikiı, Biologicheskie resursy Atlanticheskogo okeana. (Biological resources of the Atlantic Ocean). Edited by D.E. Gershanovich, V.I. Sauskan and O.A. Skarlato, Moscow, Nauka, 1986, p.276-286, In Russian. Refs. p.285-287.

Literature on the geographic and geologic characteristics of the Atlantic sector of the antarctic ocean, and the role they play in the occurrence and abundance of marine life is reviewed. The high number and variety of copepods and euphausiids is pointed out. Numerous species of fish are listed and described, especially those in the shelf waters of the Antarctic Peninsula and the South Orkney and South Shetland islands.

B-34683

Everitt, D.A., Thomas, D.P., **Observations of seasonal changes in diatoms at inshore localities near Davis Station, East Antarctica,** *Hydrobiologia,* Aug. 12, 1986 139(1), p.3-12, Refs. p.11-12.

Seventy-five diatom taxa were identified from net plankton samples collected inshore during winter, spring and summer 1977-8 near Davis Station. Species richness was found to be higher in winter than in summer; this is the first time this trend has been reported in antarctic coastal regions. When these taxa were grouped according to the general habitats in which they normally occur, the benthic assemblages dominated the planktonic ones. Of the plankton, most species were of oceanic origin in winter and late summer and are thought to have been swept inshore by a cyclonic gyre which is known to occur in summer but has not been studied in winter. (Auth.)

B-34686

Matteri, C.M., **Habitat and distribution of Falkland Islands mosses** [Los musci (Bryophyta) de las Islas Malvinas, su habitat y distribución], *Nova Hedwigia,* Aug. 1986 43(1-2), p.159-189, In Spanish with English summary. Refs. p.185-187.

The presently known moss flora of Falkland Is. amounts to 141 species and 20 varieties in 57 genera. All early records from the islands have been revised and nomenclaturally updated. Twenty-nine unrecorded taxa were found among new collections. Climate, bryological history, moss communities and habitat are briefly reviewed. A phytogeographical analysis reveals that the most common distributional pattern is Circumsubantarctic, with 24% of the mosses also found on the Subantarctic islands. Moss vegetation studies clearly define a South Atlantic cold temperate moss flora with a strong acrocarpous component and a lower pleurocarpous one (ratio 3:1) together with a low mean number of species per genus (ratio 2,6). (Auth.)

B-34687

Shaw, P., **Factors affecting the breeding performance of antarctic Blue-eyed shags *Phalacrocorax atriceps*,** *Ornis scandinavica,* May 1986 17(2), p.141-150, 29 refs.

The breeding performance of Blue-eyed shags of known age (up to 12 yr old) was studied on Signy I. for three seasons. Mate change between seasons was high (77.3%), was unaffected by the age of either partner, and was unrelated to prior or subsequent breeding success. Pairs nesting in the center of the colony experienced greater social contact, poorer access to their nests, but less exposure to wind and high seas. The degree of social contact with neighboring nests increased with the age of the male. Average clutch sizes were of 2.31-2.84 eggs, and in one season declined with laying date. The proportion of eggs which hatched also declined with laying date, by 1.5%/wk. Chick survival (to fledging) was higher in broods hatched in the first third of the season (88.2%) than in the last third (75.2%), and late-laying females fledged 0.64-0.66 fewer chicks on average. Some 19% of the variation in laying dates could be explained by individual consistency between seasons. In contrast to many long-lived species, there was no relationship between female age and laying date. Average clutch sizes increased after 10 yr. Eggs laid by 10-12 yr olds were 15% smaller than those of 4-9 yr olds, as were chick hatching-weights. The mean number of chicks hatched and fledged per pair increased between three and five years of age, but showed no significant change thereafter. (Auth.)

B-34689

Sahrhage, D., **Participation of the Federal Republic of Germany in SIBEX and CCAMLR activities on antarctic marine living resources,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.3-4, 20 refs.

During the austral summers of 1983/84 and 1984/85 the Federal Republic of Germany participated in the Second International BIOMASS Experiment (SIBEX) in the Atlantic sector of the southern ocean with the research vessels *Polarstern* and *Walther Herwig.* The distribution, abundance and biology of antarctic krill were investigated in relation to the oceanographic conditions and other factors. A wide range of other activities in research on plankton, benthos, bacteria, sediments, contaminants, and fish stocks were also carried out by various scientific teams. The research programs and cruise events are described and a summary evalution of each of the cruises is provided. (Auth. mod.)

B-34691

Siegel, V., **Structure and composition of the antarctic krill stock in the Bransfield Strait (Antarctic Peninsula) during the Second International BIOMASS Experiment (SIBEX),** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.51-72, Refs. p.71-72.

Geographic differences and seasonal changes are described for the krill *(Euphausia superba)* abundance and biomass values in the Bransfield Strait. Vertical distribution of krill during late autumn is discussed. Biomass estimations for Oct. 1983 and Mar. 1985 were similar, while the composition of the krill stock changed significantly between the seasons. A hypothesis was developed on krill migration off the Antarctic Peninsula. (Auth.)

B-34692

Nast, F., **Changes in krill abundance and in other zooplankton relative to the Weddell-Scotia Confluence around Elephant Island in November 1983, November 1984 and March 1985,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.73-94, Refs. p.93-94.

Krill abundance and that of other zooplankton were determined by net-catches in a limited area around Elephant I. at 36 stations in Nov. 1983, Nov. 1984 and Mar. 1985. In 1984 nearly half the catches were smaller than the smallest catch in 1983. In 1985, catches were even poorer. Salps and euphausiids (other than krill) dominated, whereas krill yielded outstanding numbers at some stations. The abundance of krill and salps is analyzed relative to the course of the Weddell-Scotia Confluence. Most salps were found in 1983. The decline of krill abundance is less marked considering its biomass due to increasing size with the season. Biomass values are compared with those of other areas and with the results obtained by echo-integration. (Auth.)

B-34693

Nast, F., Gieskes, W., **Phytoplankton observations relative to krill abundance around Elephant Island in November 1983,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.95-106, Refs. p.104-106.

Within the framework of SIBEX, chlorophyll *a* and zooplankton concentration measurements were carried out in a limited area around Elephant I., covered by 42 stations in early Nov. 1983. Highest concentrations of total chlorophyll *a* and of chlorophyll *a* in particles larger than 8 micron were found at the ice edge and around Elephant I., but not directly at the Weddell-Scotia Confluence. Concentration values were related to physical factors as wind stress, water column stability and oceanic fronts as well as to density values of total zooplankton, salps and krill. A significant co-occurrence of high krill with low chlorophyll $a > 8$ micron concentrations points to an inverse phytoplankton-zooplankton relationship. (Auth.)

B-34694

Klindt, H., **Acoustic estimates of the distribution and stock size of krill around Elephant Island during SIBEX 1 and 2 in 1983, 1984 and 1985,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.107-127, 14 refs.

In 1983, 1984 and 1985 three combined net- and acoustic surveys were performed in the vicinity of Elephant I. for a quantitative estimate of the total krill population. The acoustic data were sampled by means of the echointegration method. The evaluation of the raw data was done by applying a BIOMASS agreed standard procedure. The method and the results are shown. The calculated estimates of total biomass of 52,000 t (1983), 380,000 t (1984) and 16,500 t (1985) reflect the extremely high variability of the stock size of krill. Systematic and random errors are discussed. (Auth.)

B-34695

Kock, K.-H., **State of exploited antarctic fish stocks in the Scotia arc region during SIBEX,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.129-186, Refs. p.185-186.

Catch data from two bottom trawl surveys in Nov. 1983 around Elephant I. and in Jan./Feb. 1985 around South Georgia, the South Orkney Is. and Elephant I. have been used to estimate the state of exploited fish stocks. The target species of the commercial fishery are the marbled notothenia, *Notothenia rossii marmorata,* and the barred icefish, *Champsocephalus gunnari.* Both species are severely affected by the fishery in the whole Scotia arc region. Biomass estimates indicate a reduction in stock size to 10-20% of that of the pristine state. The extent to which other species are influenced by the fishery varies from area to area. Around South Georgia a substantial decline in stock sizes of *N. gibberifrons, Ps. georgianus* and *Ch. aceratus* is apparent. It seems doubtful if conservation measures established by CCAMLR for *C. gunnari* and *N. gibberifrons* will be sufficient to allow the recovery of these stocks. Around the South Orkney Is. *N. gibberifrons* and *Ps. georgianus* are obviously depleted by the fishery. Around Elephant I. species other than *N. rossii marmorata* and *C. gunnari* have apparently been little affected by fishing so far. (Auth.)

B-34696

Karl, H., **Continuous processing of raw antarctic krill into food products for human consumption on a pilot plant scale,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.187-198, Refs. p.197-198.

Centrifugation of raw krill with a jet refiner (Strahlsieb) enabled us for the first time to remove continuously and very effectively most of the digestive tract and its proteases: the residual proteolytic activity was lowered to 20% of the initial value. For removing the shells a bone separator and a decanting centrifuge, tested during the expedition 1981, were applied and led to a centrifuged, minced and decanted raw krill meat with a low fluoride content. The mass yield for this intermediate product was 40%. A solid product with good sensory properties resulted by coagulating the viscous minced krill meat at 80 C in heating plants working on different principles (microwave, heat exchanger). Based on the raw krill, following overall yields were achieved: mass: 24% and 27%, depending on the heating plant, fat: 12.5%, raw protein 26-28%, fluoride: 2.5%. (Auth.)

B-34697

Karl, H., **Heat coagulation of centrifuged raw krill mince,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.199-212, 10 refs.

The heat coagulation properties of centrifuged and decanted raw krill mince were investigated by means of a continuous operating heat exchanger plant and by a microwave pilot plant. Freshly prepared, centrifuged and decanted raw krill mince was coagulated in both plants to an elastic, crablike tasting product, liberating some liquid. The average solid-liquid proportion was 60:40 using the heat exchanger, and 68:32 applying the microwave plant. 80 to 95% of the fat, more than 86% of the raw protein and over 84% of the fluoride remained in the solid coagulate, referred to the centrifuged and decanted raw krill mince. Storage of the mince up to 17 hours before processing reduced the solid yield and the sensoric quality of the coagulate. Lowering of the pH-value of the centrifuged and decanted raw krill mince to pH 6 and pH 5, the fluoride content remaining in the coagulates could be reduced to 60% and to 36%, respectively. Coagulates from both plants had no proteolytic activity. (Auth.)

B-34698

Manthey, M., Oehlenschläger, J., Rehbein, H., **Chemical composition and sensory evaluation of coated and uncoated fillet portions processed from antarctic fish,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.213-223, 20 refs.

Blocks of practically boneless fillets were produced on board FRV *Walther Herwig* from 5 antarctic fish species *(Notothenia kempi, Notothenia gibberifrons, Notothenia rossii marmorata, Dissostichus eleginoides* and *Chaenocephalus aceratus).* The taste quality changes of these portions during frozen storage at -25 C were determined. After 2.5 months (6.5 months after catch) the portions were analyzed for parameters indicating spoilage like TVB, TMA, DMA, ammonia and thiobarbituric acid values; low levels were found for all of them and of salt soluble proteins (0.6 M NaCl). Apart from *N. kempi* portions all portions were judged as high quality products, well suitable for human consumption. The proximate composition was analyzed, showing that the fat content varied considerably: the highest amount was found in *D. eleginoides* (17.1%) the lowest in *N. gibberifrons* (0.8%). (Auth. mod.)

B-34699
Rehbein, H., **Identification of antarctic fish species by isoelectric focusing of sarcoplasmic proteins,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.225-230, 14 refs.

Samples from 15 fish species from the Atlantic sector of the antarctic ocean were analyzed by isoelectric focusing of sarcoplasmic proteins. Each species exhibited a characteristic protein pattern; in the case of 4 species of the family Nototheniidae protein polymorphism was observed. (Auth. mod.)

B-34703
Eastman, J.T., DeVries, A.L., **Antarctic fishes,** *Scientific American,* Nov. 1986 254(11), p.106-114.

Described here are the research processes utilized to understand the chain of events leading to, and the history of, the survival of the sub-order *Notothenioidei* in the cold waters surrounding Antarctica while most other fishes perished. The emphasis rests on two factors: the types and manufacturing processes of anti-freezes flowing in the blood stream and the processes developed in the notothenioids by which crossover of ice from the environment into the fish blood stream is prevented. Inability to prevent the crossover would be fatal in spite of the presence of the anti-freezes. Details of these two factors are discussed and explained.

B-34705
Buchet, C., Dewasmes, G., Le Maho, Y., **Electrophysiological and behavioral study of sleep in Emperor Penguins under natural ambient conditions,** *Physiology and behavior,* 1986 38(3), p.331-335, 40 refs.

In two pairs of Emperor Penguins surgically implanted for chronic recordings of EEG, EOG and EMG, 4 arousal stages were characterized on the basis of behavioral and electrophysiological criteria: wakefulness (W), drowsiness (D), slow-wave sleep (SWS) and paradoxical sleep (PS). The general patterns of electrographic correlates observed for each arousal state resemble those reported in other birds. Sleep patterns were examined with these two pairs placed under natural ambient conditions of light and air temperature, the first pair being exposed to moderate cold under alternate conditions of day and night, and the second studied when daylight was total to thermoneutrality. The time spent in sleep (TST) by each group was 41.3% and 45.1% of the 24 hr period respectively, the difference not being significant. As in other birds, PS occurred in very brief episodes lasting, on average, 8 to 10 seconds and occupying only 5 to 6% of the 24 hr period. Whatever the external conditions, the PS to TST ratio appeared to remain unchanged (12 to 14%). Its relatively high value is discussed in relation to predation susceptibility. (Auth.)

B-34707
Rhode, E.A., **Pressure-volume characteristics of aortas of harbor and Weddell seals,** *American journal of physiology,* July 1986 251(1), p.R174-R180, 18 refs.

The mechanical properties of the radially enlarged proximal segment of the aorta of diving marine mammals was studied on 15 excised aortas of harbor seals and five aortas of Weddell seals. Aortic bulb volume distensibility was found to be much greater than that of the descending thoracic aorta or of an equivalent aortic segment of terrestrial mammals, indicating that the total potential energy and volume that may be stored within the aortic bulb is very large. The static mechanical properties of aortic strips from the bulb and descending thoracic aortas were not markedly different, so that the differences in pressure-volume relationships are explained by differences in geometry of the two sections. The expanded aortic bulb functions through energy and volume storage actions and through uncoupling actions to maintain arterial pressures and stroke volume at near pre-dive levels during a dive. (Auth. mod.)

B-34720
Abyzov, S.S., Rusanov, V.P., Smagin, V.M., **Preliminary results of microbiological investigations at Mirnyy** [Predvaritel'nye rezul'taty mikrobiologicheskikh issledovaniĭ v Mirnom], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.78, p.133-136, In Russian. 1 ref.

A program of environmental protection from pollution, carried out at Mirnyy Station, is described. Microbiological analyses of soil and snow samples, collected in the vicinity of the station, uncovered various stages of contamination caused by man.

B-34729
Ainley, D.G., Morrell, S.H., Wood, R.C., **South Polar Skua breeding colonies in the Ross Sea region, Antarctica,** *Notornis,* 1986 Vol.33, p.155-163, 6 refs.

Using ground and aerial surveys between 1980 and 1983, numbers of known breeding sites of the South Polar Skua in the Ross Sea region were increased from 21 to 55. Some 20 more sites may occur along parts of the coast which were not surveyed, especially between Cape Adare and Cape Jones. It is estimated that the Ross Sea region has about 15,000 skuas. Up to 20% of breeders do not nest in association with penguins. Since the late 1950s, several colonies have increased, while others have decreased. Some colony changes have apparently been due to human activity. Information on banded birds indicates a low rate of exchange between colonies; some movement may be related to more food being available at refuse dumps at scientific bases. (Auth.)

B-34730
Sokolova, A.G., Prokopenko, O.V., Maĭstruk, P.N., **Supply of free amino acids to portal vein blood serum during digestion of isolated krill protein** [Dinamika postupleniia svobodnykh aminokislot v syvorotku krovi vorotnoĭ veny v protsesse perevarivaniia izolirovannogo belka kriliа], *Voprosy pitaniia,* Sep.-Oct. 1985 No.5, p.16-19, In Russian with English summary. 16 refs.

The rate of absorption of amino acids obtained from isolated krill protein administered to rat stomach was studied. Absorption of casein amino acids was determined for reference purposes. Rats subjected to 48-hour fasting were administered krill isolate and casein in the form of homogenates at a rate 540 mg protein per 100 g bw in 6 ml of distilled water. The concentration of free amino acids in the portal vein was measured after 30 min., 1, 3 and 6 hours. The content of amino acids was measured by ion-exchange chromatography with the use of an automatic analyzer of amino acids. The digestion of krill protein proceeds at a high rate. This ensures the maximal augmentation of the concentration of most amino acids in the blood of the portal vein 30 min after isolate administration to the stomach. (Auth.)

B-34731
Solomko, G.I., Prudnikova, L.V., Prokopenko, O.V., Orlova, T.A., **Hygienic characteristics of food hydrolysates from small ocean fish and krill** [Gigienicheskaia kharakteristika pishchevykh gidrolizatov iz melkoĭ okeanicheskoĭ ryby i krilia], *Voprosy pitaniia,* Sep.-Oct. 1985 Vo.5, p.19-23, In Russian with English summary. 13 refs.

A study was made of the biological value of acid and enzymatic hydrolysates from capelin, luminous anchovy and krill. Hydrolysates were obtained with the use of protosubtilin G-10-x or hydrochloric acid. Enzymatic hydrolysate from luminous anchovy was rich in sulfur-containing amino acids (score 112%), whereas the remaining products were marked by their deficiency (score 53-90%). The products were rich in lysine, leucine, isoleucine, and aromatic amino acids. The anabolic efficacy was discovered to be the highest

for enzymatic hydrolysate from luminous anchovy, exceeding the analogous characteristics for casein. The biological value of hydrolysate from capelin and krill was lower than that of casein. This was supported by the amino acid analysis data. The assimilability of all hydrolysates was established as fairly high. Hydrolysates are employed for manufacturing broth bricks and pastes. (Auth. mod.)

B-34735

Sullivan, C.W., Palmisano, A.C., SooHoo, J.B., **Influence of sea ice and sea ice biota on downwelling irradiance and spectral composition of light in McMurdo Sound,** *SPIE—The International Society for Optical Engineering. Proceedings,* 1984 Vol.489, Ocean optics 7. Edited by M.A. Blizard, p.159-165, 15 refs.

A dense population of microalgae grows in the lower layers of annual sea ice in McMurdo Sound. The attenuation of light by surface snow, congelation and platelet sea ice, and ice microalgae was measured using an underwater spectroradiometer with a cosine collector. The *in vivo* absorption spectrum derived from *in situ* light measurements was comparable to the *in vivo* absorption spectrum measured in the laboratory. Microalgae demonstrated an absorption peak at about 675 nm and a broad peak between 450 and 550 nm. Absorption of light by ice microalgae affects not only the total photosynthetically active radiation (PAR) but also the spectral composition of radiation available to under-ice phytoplankton. Thus biological as well as physical properties of sea ice determine the under-ice light field in polar oceans. (Auth.)

B-34742

Montgomery, J.C., Macdonald, J.A., **Sensory tuning of lateral line receptors in antarctic fish to the movements of planktonic prey,** *Science,* Jan. 9, 1987 235(4785), p.195-196, 9 refs.

The suitability of the lateral line system of fish and aquatic amphibia for the detection of planktonic prey was examined in the antarctic fish *Pagothenia borchgrevinki* (family Nototheniidae). The best responses of primary afferent lateral line neurons to waterborne vibrations were recorded at frequencies within the range of those produced by swimming crustacea. Simultaneous recordings from a swimming zooplankter held close to the fish and from primary afferent neurons provided direct confirmation that swimming movements of crustaceans are a potent natural stimulus of the lateral line system. (Auth.)

B-34743

Cannon, R., **Effects of ingestion of liquids on the cold tolerance of an antarctic mite,** *Journal of insect physiology,* 1986 32(11), p.955-961, Refs. p.960-961.

Samples of a cryptostigmatid mite, *Alaskozetes antarcticus,* were collected during summer and winter on Signy Island. In four experiments, adult mites were maintained at 4 C and 100% r.h. for periods of 14, 28 and 32 days. In two of these experiments the mites received cold-hardening pre-treatments at -15 and -20 C (56 and 21 days respectively). The experiments compared: the effects of acclimation with and without access to distilled water; the effects of liquid glucose and algal diets, in terms of cold hardiness. In one of the experiments, changes in live weight and body water content were determined. For cold-hardy mites, with high glycerol levels and low supercooling points, the distilled water and glucose treatments produced an extreme loss (about 20-25 C) of supercooling ability. When no liquid was available, only a small (about 4 C) loss occurred. Glycerol concentrations decayed in both cases. Non cold-hardy mites, with low glycerol levels and a wide range of supercooling points, did not show differing responses when acclimated at 4 C with and without distilled water, but exposure to glucose solution did result in extreme supercooling point elevations. These results are related to seasonal changes in *Alaskozetes* cold hardiness in the field, and are discussed in terms of hypotheses advocating external (bacterial and mineral) and internal (organic) sources of ice-nucleating agents. (Auth.)

B-34744

Thomas, D.P., Jiang, J., **Epiphytic diatoms of the inshore marine area near Davis Station,** *Hydrobiologia,* Sep. 30, 1986 140(3), p.193-198, 11 refs.

Collections of marcophytic algae from the subtidal and lower intertidal regions were processed to observe the diatom epiphytes both by light and scanning electron microscopy. For the purpose of comparison some samples of the sub-ice assemblage were also collected and processed similarly. The standing crop of epiphytes was high throughout the winter as well as the summer but the community composition varied depending upon the collection site and the morphology of the host macrophyte. The genus *Cocconeis* was ubiquitous achieving densities approaching 100,000 cells/sq cm and surpassed only by *Nitzschia* with a density of twice that amount on one sample. (Auth.)

B-34745

Bayly, I.A.E., **Ecology of the zooplankton of a meromictic antarctic lagoon with special reference to *Drepanopus bispinosus* (Copepoda: Calanoida),** *Hydrobiologia,* Sep. 30, 1986 140(3), p.199-231, Refs. p.230-231.

The zooplankton of Burton Lake, a meromictic lagoon with a tenuous connection to Krok Fjord near Davis Station was studied during the summer of 1981. Sampling occurred through a 10 cm diameter ice-hole. Four metazoan species occurred in the zooplankton: *Drepanopus bispinosus* and *Paralabidocera antarctica* (Copepoda), *Rathkea lizzioides* (Anthomedusae) and a cydippid ctenophore. Except for *R. lizzioides,* the lower limit of the vertical distributions occurred precisely at the oxycline at a depth of 8.15 m. The densities of both *R. lizzioides* and the ctenophore were low throughout the depth range 5.0-7.25 m and considerably higher above and below this stratum. The mean summer standing crop of total zooplankton was almost 80 mg (dry weight)/cu m. This value is high compared with those of most other marine waters. The structure and composition of the zooplanktonic community of the lagoon were quite distinct from those of the fjord with which water was exchanged during Jan. and Feb. The summer standing crop of the lagoon was substantially greater than that of the fjord in terms of both unit surface area and unit volume of water. A tentative food web for the lagoon is presented. (Auth.)

B-34746

Bratkowska, I., Zwierzykowski, W., **Changes of phospholipid fraction from krill lipids in a cold stored mixture with cod muscle homogenate,** *Acta alimentaria polonica,* 1985 11(2), p.225-233, 20 refs.

Changes of phospholipids fraction of krill lipids taking place during its 6-month storage at -5 C in a mixture with cod muscle homogenate were investigated. The observed changes in oxidation degree, free fatty acids content and fatty acids composition reflect only a part of the complex changes taking place in the investigated system because of competing reactions of oxidation and hydrolysis of phospholipids and their internal interaction as well as interaction with proteins, aminoacids and with the products of their degradation. (Auth.)

B-34747

Protasowicka, A., **Carotenoids in frozen antarctic krill and in some of its semifinished products,** *Acta alimentaria polonica,* 1985 11(2), p.235-245, 17 refs.

The qualitative and quantitative composition of carotenoids in frozen antarctic krill, in protein concentrates and in chitin waste was

investigated. It was found that astaxanthin was the dominant carotenoid in the studied material. (Auth.)

B-34753

Warén, A., Arnaud, P.M., Cantera, J.R., **Descriptions of two new gastropods of the Trichotropidae from Kerguelen and Crozet Islands (South Indian Ocean),** *Veliger,* Oct. 1, 1986 29(2), p.157-165, 21 refs.

Two new species of prosobranchs, *Torellia lanata* and *T. (Neoconcha) angulifera,* are described from Kerguelen and Crozet Islands. The two species are compared to all previously described antarctic trichotropids and to some similar species from other areas. *Neoconcha vestita* Smith, 1907, is transferred to *Torellia* and given a new name, *T. (N.) smithi,* because of homonymy with *T. vestita* Jeffreys, 1867. The larval development in some species of *Torellia* is discussed. (Auth.)

B-34756

Kellermann, A., **Biology of early life stages of notothenioid fishes (Pisces) off the Antarctic Peninsula** [Zur Biologie der Jugendstadien der Notothenioidei (Pisces) an der Antarktischen Halbinsel], *Berichte zur Polarforschung,* 1986 No.31, 148p. + append., In German with extended English summary. Refs. p.139-147.

A detailed account is given of the predation behavior of Notothenioids as sub-juveniles and juveniles. Predation is related to krill spawning in Bransfield Strait and the northern Weddell Sea with plankton and krill eggs being primary food sources in the very young. Prey size gradually increases as the fish grow to juvenile stages and mouths widen to accommodate larger krill. Vertical, horizontal, and seasonal distribution patterns of Notothenioids are discussed.

B-34758

Robineau, D., Duhamel, G., **Diet of Commerson dolphin *Cephalorhynchus commersonii* (Lacepède, 1804) from the Kerguelen Islands during austral summer** [Régime alimentaire du dauphin de Commerson *Cephalorhynchus commersonii* (Lacepède, 1804) aux îles Kerguelen, pendant l'été austral], *Paris. Muséum national d'histoire naturelle. Bulletin. Section A Zoologie, biologie et écologie animales,* Apr.-June 1984 6(2), p.551-559, In French with English summary. 11 refs.

A study of stomach contents of 11 Commerson's dolphins showed an ichthyophagous diet. A semi-pelagic fish *(Champsocephalus gunnari)* was the most abundant fish species found in the stomachs. Other more benthic fish species were less frequent. Pieces of algae, probably incidentally swallowed, and invertebrates were also found, among them crustacea (euphausiacea, amphipoda, decapoda), and in one of the dolphins, ascidians and annelids. It appears that Commerson's dolphin only feed in coastal waters. Parasite nematoda, genus *Pseudoterranova,* were found in the stomach of every dolphin. (Auth.)

B-34762

Peterson, I., **Biological antifreeze,** *Science news,* Nov. 22, 1986 130(21), p.330-332.

Antifreeze mechanisms in antarctic fish are reviewed and possible hypotheses as to how the mechanisms work are explained, based on conversations with scientists in the field. Numerous factors, including temperature, freezing and melting points of fish blood, salinity of the environment, operate in a fine balance to prevent ice crystals from forming in the blood stream which carries the antifreeze protein glycopeptides to other body fluids. Research emphasis is on learning what goes on at the ice-water interface to discover how the glycopeptides prevent crystallization.

B-34763

Ohsumi, S., **Earplug transition phase as an indicator of sexual maturity in female antarctic minke whales,** *Tokyo. Whales Research Institute. Scientific reports,* Mar. 1986 No.37, p.17-30, 12 refs.

The transition phase in the earplug of the minke whale *(Balaenoptera acutorostrata)* was examined in 360 females caught in Areas III and IV in 1971/72-1981/82 seasons. It was confirmed from seven kinds of examinations that the transition phase can be regarded as an indicator of the sexual maturity of the minke whale. The transition phase is fully identified at the time of accumulation of 4-5 growth layers after its formation. Ten to 15% of sexually mature whales do not form identifiable transition phase in earplugs. Annual ovulation rate, estimated from age at capture, age at transition phase and number of ovarian corpora, was found to change from 1.9 in the early stage of sexual maturity to 0.9 in older animals. (Auth. mod.)

B-34764

Horwood, J.W., **Lengths and distribution of antarctic sei whales,** *Tokyo. Whales Research Institute. Scientific reports,* Mar. 1986 No.37, p.47-60, Refs. p.59-60.

Data from the Bureau of International Whaling Statistics are used to examine the distribution and lengths of sei whales caught by the pelagic fleets in the Antarctic over the period 1931 to 1978. Maximum lengths found were 61 feet for males and 64 for females. In all months and longitudinal bands mean lengths of whales of both sexes were greater south of the Antarctic Convergence. These mean differences ranged from 0.5-3.8 feet for males and 0.9-3.9 feet for females. The distribution of larger whales is similar north and south of the Convergence and the difference is caused by most of the smaller whales staying north of the Convergence. (Auth. mod.)

B-34765

Lichter, A.A., **Records of beaked whales (Ziphiidae) from the western South Atlantic,** *Tokyo. Whales Research Institute. Scientific reports,* Mar. 1986 No.37, p.109-127, Refs. p.126-127.

Five genera comprising eight species of the family Ziphiidae *(Tasmacetus shepherdi, Berardius arnuxii, Mesoplodon densirostris, M. layardii, M. hectori, M. grayi, Ziphius cavirostris* and *Hyperoodon planifrons)* have been recorded from the western and southwestern South Atlantic including the Falkland and the South Georgia islands. A review of published records for the area is given and new and unpublished records are presented for *Mesoplodon layardii, M. hectori, M. grayi, Ziphius cavirostris* and *Hyperoodon planifrons.* The first known gonad weights are given for *M. layardii.* A mass stranding of *M. hectori* included two adult females and two calves; one of the calves, of 190 cm, the smallest known to date. (Auth.)

B-34766

Horwood, J.W., **Distribution of the southern blue whale in relation to recent estimates of abundance,** *Tokyo. Whales Research Institute. Scientific reports,* Mar. 1986 No.37, p.155-165, Refs. p.164-165.

Based on data from systematic sightings surveys for minke whales a recent stock estimate was obtained fo blue whales in the Antarctic. This study reviews previous information on the distribution of blue whales and confirms that the time and extent of the surveys was suitable to provide information on the abundance of blue whales. It would appear that the number of blue whales in the Antarctic is less than 2000; much less than previous estimates indicated. (Auth.)

B-34784
Weber, L.H., El-Sayed, S.Z., Hampton, I., **Variance spectra of phytoplankton, krill, and water temperature in the Atlantic Ocean south of Africa,** *Deep-sea research,* Oct. 1986 33(10A), p.1327-1343, 55 refs.

The scale dependence of the variability in phytoplankton and krill abundance, and in the physical environment, are examined by applying the techniques of power spectral analysis to continuous horizontal records of surface seawater temperature, surface *in vivo* fluorescence and acoustically derived estimates of integrated krill density. Data were collected in the area between 60-70 S and 15-30 E. Similarity in the power spectra for temperature and *in vivo* fluorescence suggests that over the range of 4-20 km, the variability in phytoplankton biomass is largely determined by physical process. However, the steepness of the fluorescence variance spectrum relative to the temperature spectrum, together with consistent coherence between the phytoplankton and krill profiles, suggests that predator-prey interactions are also of importance in determining the distributional patterns of the phytoplankton. Krill distributions exhibit considerable small-scale patchiness, and over the 2-20 km length scales resolved in this study, the krill variance spectrum is similar to a white noise spectrum. (Auth.)

B-34785
Wilson, D.L., Smith, W.O., Jr., Nelson, D.M., **Phytoplankton bloom dynamics of the western Ross Sea ice edge—I. Primary productivity and species specific production,** *Deep-sea research,* Oct. 1986 33(10A), p.1375-1387, 42 refs.

Primary production was elevated within the ice-edge bloom, with integrated euphotic zone production averaging 40.1 mg C/sqm/h. The production was elevated in regions where ice melt had created a strong vertical stability, and was decreased outside the zone of meltwater influence. Microautoradiographic analyses and species abundance data showed that a single species of diatom, *Nitzschia curta,* a species generally considered to be epontic, contributed up to 93% of the total productivity and 70% of the number of phytoplanktonic cells. Growth rates determined from autoradiography and carbon estimates based on cell volume as well as those determined from bulk production data agreed well and ranged from 0.1 to 0.5 divisions per day. No difference in growth rates between populations within and from outside the bloom was noted, an observation which is believed to reflect the recent mixing of the phytoplankton as vertical stability weakened. It is concluded that the bloom was seeded by algae released from melting ice, and that an ice-edge bloom can have substantial impact on the biogeochemical cycles and food-web dynamics of the southern ocean. (Auth.)

B-34786
Nelson, D.M., Smith, W.O., Jr., **Phytoplankton bloom dynamics of the western Ross Sea ice edge—II. Mesoscale cycling of nitrogen and silicon,** *Deep-sea research,* Oct. 1986 33(10A), p.1389-1412, 65 refs.

In the austral summer of 1983 the spatial distributions of nutrients and phytoplankton biomass, nutrient assimilation rates and phytoplankton growth rates in an intense diatom bloom associated with a receding ice edge in the western Ross Sea were examined. There was significant near-surface depletion of nitrate, phosphate and silicic acid within the bloom, but at almost all stations their concentrations remained higher than those generally considered limiting to phytoplankton growth. Ammonium concentrations within the bloom were frequently below detection limits. Rates of nitrate uptake were high enough to satisfy approximately 65% of the phytoplankton nitrogen demand estimated from C-14-primary productivity and particulate organic carbon:nitrogen ratios. Growth rates estimated for the overall phytoplankton assemblage based on N-15 uptake, and the diatom assemblage based on 30-Si uptake, were generally between 0.07 and 0.4 divisions per day. The mean rate of biogenic silica productions within the bloom was 38 mmol Si/sq m/day. (Auth. mod.)

B-34787
Ross, R.M., Quetin, L.B., **Effect of pressure on the sinking rates of the embryos of the antarctic krill, *Euphausia superba*,** *Deep-sea research,* 1985 32(7), p.799-807, 14 refs.

The sinking rates of embryos of the antarctic krill, *Euphausia superba,* were measured during development in the laboratory. The sinking rates were determined at two hydrostatic pressures, 10 and 1000 dbar. There was no significant difference in the sinking rates of the eggs measured at the two pressures at any time during development. The two possible effects of hydrostatic pressure—increasing the density of the seawater and compressing the embryo—are antagonistic and of the same relative magnitude. In a static water column, the effect of the physical environment on the developmental time and not the sinking rate appears to be the most important factor determining the depth where the embryos of *E. superba* hatch. (Auth.)

B-34788
Palmisano, A.C., **Photoadaptation in *Phaeocystis pouchetii* advected beneath annual sea ice in McMurdo Sound, Antarctica,** *Journal of plankton research,* Sep. 1986 8(5), p.891-906, 50 refs.

A bloom of the colonial microalga *Phaeocystis pouchetii* was advected from ice-free waters to beneath 1.5 m of annual fast ice in east McMurdo Sound in late December 1984. Strategies of photoadaptation to a reduction in growth irradiance involved a 3- to 4-fold increase in photosynthetic efficiency per chlorophyll *a* and a 2- to 3-fold increase in photosynthetic efficiency per cell. The index of photoadaptation decreased by 50% on both a chlorophyll *a* and cellular basis. *In situ* production by *Phaeocystis* under sea ice is estimated to contribute 16 g carbon/sq m annually, a value comparable with sea ice algal production. (Auth.)

B-34789
Marin, V., Antezana, T., **Species composition and relative abundance of copepods in Chilean fjords,** *Journal of plankton research,* 1985 7(6), p.961-966, 15 refs.

The species composition of copepods in the fjord region, Isla Madre de Dios, Chile was studied during October 1979. Fifteen new records for the fjords are cited. The antarctic copepod *Paraeuchaeta antarctica* which is consistent with early records of other antarctic zooplankters in the area was found. The analysis of relative abundances shows that changes in dominance occur only among four most abundant species of copepods. (Auth.)

B-34790
Rivkin, R.B., **Radioisotopic method for measuring cell division rates of individual species of diatoms from natural populations,** *Applied and environmental microbiology,* Apr. 1986 51(4), p.769-775, 56 refs.

Silicon is an essential element for diatom frustule synthesis and is usually taken up only by dividing cells. With Ge-68, a radioactive analog of Si, the cell cycle marker event of frustule formation was identified for individual species of diatom. The frequency of cells within a population undergoing this division event was estimated, and the cell division rate was calculated. In laboratory cultures, these rates of cell division and those calculated from changes in cell numbers were similar. By dual labeling with Ge-68(OH)4 and NaHC-14O3, rates of cell division and photosynthesis were coincidently measured for diatoms both in laboratory cultures and when isolated from natural populations in estuarine, offshore, and polar environments. These techniques permit the coupling between photosynthesis and cell division to be examined *in situ* for individual species of diatom. The environmental focus of this study includes Chesapeake

Bay, temperate coastal and offshore regions and McMurdo Sound. (Auth. mod.)

B-34791

Howard-Williams, C., Vincent, C.L., Broady, P.A., Vincent, W.F., **Antarctic stream ecosystems: variability in environmental properties and algal community structure,** *Internationale Revue der gesamten Hydrobiologie,* 1986 71(4), p.511-544, Refs. p.542-544.

The variability in physical, chemical and biological properties was examined for a number of glacier melt streams in south Victoria Land. Streams flowed for between one and two months. Stream water temperatures (range 0-11 C) varied over short (hr) time scales whilst discharges varied considerably between streams (range 0.001-15 cu m/s) and over diel cycles. Solar radiation and air temperature were major determinants of stream discharge. Variability in discharge was reflected in variability in nutrient chemistry and sediment load. Nitrogen and phosphorus varied considerably between streams; the meltwaters early in summer contained 10-20 times higher levels of dissolved N and P than later in the season. Within stream nutrient levels were modified by dense algal growths and penguin rookeries. Epilithic algal communities were made up predominantly of cyanophyceae which formed mats and crusts. Longitudinal and horizontal variability of species in the communities in selected streams is described. Analyses of algal cover and biomass (chlorophyll *a*) show that substrate type and flow rates are of greater importance than nutrients in influencing algal abundance and biomass. (Auth.)

B-34793

Mironov, A.N., **Accumulation effect in distribution of sea urchins** [Akkumuliativnyĭ effekt v rasprostranenii morskikh ezheĭ], *Zoologicheskiĭ zhurnal,* Aug. 1983 62(8), p.1202-1208, In Russian with English summary. 14 refs.

DLC QL1.Z747

Literature is reviewed showing that the greatest number of abyssal genera and species of sea urchins known in the Antarctic are also found in the North Pacific. The processes leading to faunistic similarity between geographically remote regions are generalized in the following scheme: development of a fauna with high taxonomic diversity—migration of animals over great distances through regions with less favorable conditions of life—accumulation of taxa in a geographically remote region where favorable conditions have relatively recently arisen. (Auth. mod.)

B-34795

Watkins, J.L., **Variations in the size of antarctic krill, *Euphausia superba* Dana, in small swarms,** *Marine ecology progress series,* June 1986 31(1), p.67-73, 23 refs.

Studies on the characteristics of krill in individual swarms require sampling methods which ensure that the swarms are sampled discretely. A study on the size composition of krill swarms using an enlarged Longhurst-Hardy plankton recorder (LLHPR) and an echosounder reveal that the length frequency distributions of krill in adjacent swarms were often significantly different. In contrast, length frequency distributions from within the same swarm were not usually significantly different and any differences were probably caused by several swarms overlapping in the LLHPR samples. The size of krill in the samples showed as much variation over short distances (several hundred meters) as over longer distances (several kilometers). Differences in size between adjacent swarms are probably due to a length-dependent sorting mechanism that restricts the size range of krill in the swarm. The presence of a few adults in many juvenile swarms indicate that this mechanism does not always operate. (Auth.)

B-34796

Zamponi, M.O., **Some pelagic larvae of Anthozoa (Coelenterata)** [Algunas larvas pelagicas de Anthozoa (Coelenterata)], *Neotropica,* Dec. 1, 1982 28(80), p.171-182, In Spanish with English summary. Refs. p.181-182.

DLC QL235.N4

Larvae of three types of Anthozoa are discussed: one zoantharian, *Zoanthina diamanta* Bamford, 1912, and two actinarian, *Peachia bastata* Gosse, 1855, and *Actinostola crassicornis* Hertwig, 1882. The larvae of the last species correspond to the *Halcampoides* stage. The larvae were analyzed morphologically and their pelagic-benthic life cycle was studied. During their pelagic life the larvae are oceanic, and the diagrams of temperature-salinity show the larvae to occur at 2.3 C to 14.5 C, and 33.70 per mill to 34.11 per mill, from May to Sep. (Auth. mod.)

B-34797

Dearborn, J.H., Ferrari, F.D., Edwards, K.C., **Can pelagic aggregations cause benthic satiation? Feeding biology of the antarctic brittle star *Astrotoma agassizii* (Echinodermata: Ophiuroidea),** *American Geophysical Union. Antarctic research series,* Oct. 31, 1986 44(17), Biology of the antarctic seas, p.1-28, Refs. p.25-28.

Information on the diet, feeding behavior, and surface morphology was obtained for *Astrotoma agassizii,* a large, simple-armed member of the suborder Euryalina found on the Antarctic shelf. Material was collected at South Georgia and along the Antarctic Peninsula between 1975 and 1983. Copepods occurred in 75.6% of brittle stars containing food and were the dominant prey group, followed by mysids (34.6%), chaetognaths (10.2%), and euphausiids (8.9%). All copepods in the stomachs of *Astrotoma* were calanoids belonging to 12 species generally considered pelagic animals. This association of an herbivorous calanid and predatory euchaetid may result from the well-known seasonal migrations of *Calanoides.* Upon completing their epipelagic season, aggregations of lipid-rich, late-stage copepodids of *C. acutus* might be expected to attract larger pelagic predators, including the euchaetid. In Shoal waters this association of downward migrating herbivores and their predators may bring these calanoids in close proximity to the substrate, thereby providing a rich, seasonally predictable food source to the brittle stars. These interactions suggest that carbon fixed in surface waters may be transferred to the benthos within a year. (Auth. mod.)

B-34798

Wasmer, R.A., **Pelagic shrimp of the family Oplophoridae (Crustacea: Decapoda) from the Pacific sector of the southern ocean: USNS *Eltanin*,** *American Geophysical Union. Antarctic research series,* Oct. 31, 1986 44(17), Biology of the antarctic seas, p.29-68, Refs. p.61-68.

Pelagic shrimps belonging to the family Oplophoridae collected on USNS *Eltanin* cruises 10, 11, 14-16, 19-21, 24, and 25 are the subject of this study. The cruises were made between Oct. 1963 and Nov. 1966 as part of the U.S. Antarctic Research Program. The major hydrographic features of the Pacific sector of the southern ocean and the biogeography of the southern ocean are reviewed. A total of 2415 oplophorid specimens representing 10 species from five genera were identified from the materials. Keys are presented for the identification of the oplophorid genera and species from the samples. Species discussions include illustrations, synonymies, diagnoses, brief lists of materials, summaries of geographic and depth distributions, and general remarks. Maps of the geographic distribution in relation to the Antarctic and Subtropical convergences in the study area are presented for each species, and the patterns of distribution of the species are discussed in relation to the major hydrographic regions of the Pacific sector of the southern ocean. (Auth. mod.)

B-34799
Eakin, R.R., Dearborn, J.H., Townsend, W.C., **Observations of marine birds in the South Atlantic Ocean in the late austral autumn,** *American Geophysical Union. Antarctic research series,* Oct. 31, 1986 44(17), Biology of the antarctic seas, p.69-86, Refs. p.85-86.

Thirty-five species of seabirds and undetermined species of prions were observed over the South Atlantic Ocean, near South Georgia and the South Sandwich Is., in May and June 1975, a season for which few published observations of birds are available for this area. In addition, unconfirmed sightings were made of two species, rockhopper penguin and white-bellied storm petrel. Distributions of birds and sea surface temperatures were correlated, but few clear patterns of zonation were apparent, possibly because the observations were made before winter distribution patterns were fully established. (Auth.)

B-34815
Qvist, J., **Hemoglobin concentrations and blood gas tensions of free-diving Weddell seals,** *Journal of applied physiology,* Oct. 1986 61(4), p.1560-1569, 31 refs.

Arterial blood gas tensions, pH, and hemoglobin concentrations were measured in four free-diving Weddell seals *Leptonychotes weddelli.* 24 single and 31 serial aortic blood samples were obtained. O2 tension at rest increased with diving compression to a maximum measured value of 232 Torr and then rapidly decreased to 25-35 Torr. The lowest diving arterial O2 tension measured was 18 Torr just before the seal surfaced from a 27-min dive. A consistent increase of arterial hemoglobin concentrations occurred during each dive. It is suggested that an extension of the sympathetic outflow of the diving reflex possibly caused profound contraction of the Weddell seal's very large spleen. This contraction may have injected large quantities of red blood cells (2/3 of the total) into the seal's central circulation during diving and allowed arterial O2 content to remain constant for the first 15-18 min of long dives. The increase of arterial CO2 tensions during the dive and the compression increase of arterial N2 tensions were also moderated by injecting red blood cells sequestered at ambient pressure. After each dive circulating red blood cells are oxygenated and rapidly sequestered, possibly in the spleen during the first 15 min of recovery. (Auth. mod.)

B-34816
Hill, R.D., **Microcomputer monitor and blood sampler for free-diving Weddell seals,** *Journal of applied physiology,* Oct. 1986 61(4), p.1570-1576, 8 refs.

The equipment used for the first sampling of arterial blood at depth on free-diving Weddell seals *Leptonychotes weddelli* is described. Blood was withdrawn through an aortic catheter by a submersible, peristaltic roller pump and stored in a single- or multiple-sample collection device. The multiple sampler allowed up to eight individual blood samples to be collected during a single dive. The blood pump was controlled by a dedicated microcomputer that allowed initiation of blood sampling at flexible combinations of depth and/or time during either the descending or ascending phase of the dive. The dedicated microcomputer also recorded swimming depth, velocity heart rate, and body temperature at selectable time intervals. These data were transmitted to a laboratory computer, and blood samples were retrieved, when the seal surfaced to breathe. (Auth.)

B-34817
Pietz, P.J., **Daily activity patterns of South Polar and Brown skuas near Palmer Station, Antarctica,** *Auk,* Oct. 1986 103(4), p.726-736, Refs. p.735-736.

A behavioral study of sympatrically nesting South Polar *(Catharacta maccormicki)* and Brown skuas *(C. lonnbergi)* was conducted for a total of 4,058 bird-hours of observations, during the 1979-1980 and 1980-1981 austral summers near Palmer Station. South Polar skuas exhibited maximum resting and minimum foraging activity during the twilight period around 24:00. Brown skuas appeared to rest and forage more randomly. Members of a mixed pair exhibited patterns similar to those of their respective species. Several hypotheses are suggested to account for species differences in activity patterns; most of these relate dietary differences and differential foraging abilities at low light levels. In both species, agonistic and preening activities occurred at all hours. Foraging bouts averaged 13 min for Brown Skuas with feeding territories and about 1 h for those without. South Polar Skuas averaged feeding trips of 2-3 h when the sea was open and over 7 h during heavy ice cover. Individual activity patterns were shaped by reproductive priorities as well as by feeding ecology and light levels. (Auth. mod.)

B-34818
Trivelpiece, W.Z., Bengtson, J.L., Trivelpiece, S.G., Volkman, N.J., **Foraging behavior of Gentoo and Chinstrap penguins as determined by new radiotelemetry techniques,** *Auk,* Oct. 1986 103(4), p.777-781, 24 refs.

Analysis of radio signals from transmitters affixed to 7 Gentoo *(Pygoscelis papua)* and 6 Chinstrap *(P. antarctica)* penguins allowed tracking penguins at sea. Signal characteristics allowed to distinguish among 5 foraging behaviors: porpoising, underwater swimming, horizontal diving, vertical diving, and resting or bathing. Gentoo Penguins spent a significantly greater portion of their foraging trips engaged in feeding behaviors than Chinstraps, which spent significantly more time traveling. Gentoos had significantly longer feeding dives than Chinstraps (128 s vs. 91 s) and significantly higher dive-pause ratios (3.4 vs. 2.6). These differences in foraging behavior suggest Gentoo and Chinstrap penguins may have different diving abilities and may forage at different depths. (Auth.)

B-34819
Copson, G.R., **Diet of the introduced rodents *Mus musculus* L. and *Rattus rattus* L. on subantarctic Macquarie Island,** *Australian wildlife research,* 1986 13(3), p.441-445, 11 refs.

The diets of *Mus musculus* and *Rattus rattus* on Macquarie I. were investigated by analysis of stomach contents collected monthly for 12 months. The diet of the house mouse was found to be mainly invertebrate matter but that of the ship rat was mainly plant material. Seasonal variations were found in both diets but were greater in that of the ship rat than that of the house mouse. (Auth.)

B-34820
Lawrence, J.M., **Proximate composition and standing crop of *Durvillaea antarctica* (Pheophyta) in the Bay of Morbihan, Kerguelen (South Indian Ocean),** *Marine ecology progress series,* Oct. 1986 33(1), p.1-5, 13 refs.

The proximate composition (% dry weight) of *Durvillaea antarctica* (Cham.) Hariot was similar for the frond and stipe, being 28% ash, 3% protein, *ca* 1% lipid, less than 10% acid-soluble carbohydrate, and 60% acid-insoluble carbohydrate. The holdfast differed by being 22% ash and 66% acid-insoluble carbohydrate. The energetic level of all 3 components was *ca* 13 kJ/g dry wt and *ca* 17 kJ/g ash-free dry wt. The relative proportion of the 3 plant components varied little for plants having stipe diameters ranging from 10 to 40 mm, being *ca* 8, 3, and 89% wet wt and *ca* 10, 4, and 86% kJ for the holdfast, stipe, and frond, respectively. Maximal density found in summer was 471 individual plants/1 sq m, 226 kg wet wt/sq m, and 457,000 kJ/sq m. Juvenile plants dominated in terms of individuals, but adults were more important in gravimetric and energetic units. *D. antarctica* allocates most of its biomass and energy to the frond throughout its size range. The characteristics of *D. antarctica* in the Bay of Morbihan are those for a sheltered shore. (Auth.)

B-34821
Heinbokel, J.F., Coats, D.W., **Patterns of tintinnine abundance and reproduction near the edge of the seasonal pack ice in the Weddell Sea, November 1983,** *Marine ecology progress series,* Oct. 1986 33(1), p.71-80, 39 refs.

Tintinnine populations were sampled at 27 stations in the open water of the Weddell Sea near the edge of the seasonal pack-ice in November 1983. Additional samples were obtained from a second ship operating within the pack-ice. Tintinnine assemblages in the surface water were sparse (about 17 individuals/l) and were primarily composed of the characteristically antarctic genera *Laackmanniella* and *Cymatocylis.* Tintinnine abundance at the surface was positively correlated with phytoplankton biomass and productivity. Following nuclear staining, epifluorescence microscopy of material collected with vertical net-tows from within the surface mixed layer allowed the determination of the Frequency of Dividing Cells (FDC) for the 2 dominant taxa in these samples. Diel periodicity was not observed in the division of either taxon. FDC is compared for these two species and they with temperate varieties. Environmental factors such as the pack ice, latitude, and phytoplankton biomass and productivity are related to the FDC. These genera of tintinnines appear to respond differentially to one or more factors related to latitude, even in the extremely restricted geographic range considered by this study. (Auth. mod.)

B-34822
Johnson, T.O., Smith, W.O., Jr., **Sinking rates of phytoplankton assemblages in the Weddell Sea marginal ice zone,** *Marine ecology progress series,* Oct. 1986 33(2), p.131-137, 25 refs.

A homogeneous sample method (SETCOL) was used to measure sinking rates which permitted rates of various parameters of particulate matter to be determined simultaneously. Parameters assayed in this study included chlorophyll *a,* phaeophytin, biogenic silica, particulate carbon, particulate nitrogen, and for certain stations, numbers of diatoms. Sinking rates varied within each measurement but exhibited the following trends: phaeophytin>biogenic silica>particulate carbon>diatoms>particulate nitrogen>chlorophyll *a.* Sinking rates as determined by chlorophyll *a* ranged from 0 to 2.73 m/d, similar to those reported for temperate and subpolar regions of the ocean. Phytoplankton assemblages from pycnoclines generally sank slower than those from the surface; differences in seawater density and viscosity between the 2 depths could account for no more than 5% of the observed differences. Samples placed in the dark tended to sink faster than those placed in surface light. The reported rates represent the settling of suspended microparticulates within the upper water column in the absence of turbulence and should not be extrapolated to estimate the vertical flux of particulates from the euphotic zone. (Auth.)

B-34823
Sieg, J., **Crustacea Tanaidacea of the Antarctic and the Subantarctic. 1. On material collected at Tierra del Fuego, Isla de los Estados, and the west coast of the Antarctic Peninsula,** *American Geophysical Union. Antarctic research series,* Dec. 26, 1986 45(18), Biology of the antarctic seas, 180p., Refs. p.177-180.

About 2700 tanaidaceans from 131 stations collected by scientists on board the R/V *Hero* at Tierra del Fuego, Isla de los Estados, and along the west coast of the Antarctic Peninsula were studied. A total of 36 species representing 26 genera in 11 families were determined. Of these taxa, 4 genera, 1 subgenus, and 12 species are described as new to science. Of the remaining 24 species, only 9 were known previously from the area studied. Range extensions are reported for 14 species, only 1 of which is listed for the Antarctic/Subantarctic region for the first time. A key to the Recent suborders of the Tanaidacea and distribution maps for each species are presented. The majority of species belong to the suborder Tanaidomorpha. The systematics of several subunits, especially of the Leptognathiidae, are briefly discussed, and a key to the families is given. (Auth. mod.)

B-34825
IAkush, E.V., Maksimova, O.N., Golovnia, R.V., **Changes in composition of free amino acids during sterilization of canned antarctic shrimp** [Izmenenie sostava svobodnykh aminokislot v protsesse sterilizatsii konservov iz miasa antarkticheskoĭ krevetki], *Rybnoe khoziaĭstvo,* 1986 No.3, p.69-70, In Russian.

Free amino acids composition and concentration changes during sterilization of canned antarctic shrimp *(Pandalus borealis)* were studied; it is shown that the portion of phosphoethanolamine, glycine, beta-alanine, arginine and proline comprised 91.02% of the total free amino acids. The changes were complex, including degradation and accumulation processes, especially of acids which participate in imparting taste to the canned meat. Tables are presented showing the contents of 23 amino acids (and NH 3) before and after sterilization.

B-34826
Larrain, A.P., ***Brachysternaster,* new genus, and *Brachysternaster chesheri,* new species of antarctic echinoid (Spatangoida, Schizasteridae),** *Polar biology,* 1985 4(3), p.121-124, 12 refs.

The new schizasterid genus *Brachysternaster* has several advanced features including brooding marsupia and a previously unknown type of plastron, herein named brachysternous. The new species is large, ovoid, entirely lacks fascioles and has well differentiated primary spines. *Brachysternaster* is related to the schizasterid genus *Amphipneustes* Koehler. (Auth.)

B-34827
George, R.Y., Strömberg, J.-O., **Development of eggs of antarctic krill *Euphausia superba* in relation to pressure,** *Polar biology,* 1985 4(3), p.125-133, 19 refs.

This experimental study on the embryology of *Euphausia superba* conducted at Palmer Station during the 1982-1983 austral summer, focuses upon the influence of increasing hydrostatic pressure on the development of krill eggs at 2 C. The following was found: krill embryonic development is inhibited at 4 C; the sinking rate of eggs and embryos is not significantly influenced by pressure. Based on a simulated model of sinking rate, egg development was studied at increasing pressure. Pressure of 5-20 atm accelerates the rate of cleavage and therefore the 32-celled stage is attained within 5-8 h, while at 1 atm it takes 13 h to reach the same stage. Pressure seems to have some influence on the duration of different developmental stages of krill embryos. (Auth. mod.)

B-34828
McConville, M.J., Mitchell, C., Wetherbee, R., **Patterns of carbon assimilation in a microalgal community from annual sea ice, East Antarctica,** *Polar biology,* 1985 4(3), p.135-141, Refs. p.141.

Patterns of carbon assimilation into photosynthetic end products were measured in annual sea ice near the Davis and Mawson stations during Dec. 1982, following the peak of the spring ice algal bloom. Rates of C-14 assimilation in the ice communities were measured with an *in situ* sampler-incubation chamber. The partitioning of C-14 bicarbonate into four subcellular fractions, and the efficacy of extraction, was determined. High C-14 incorporation into MeOH/H2O- and TCA-soluble fractions occurred during *in situ* incubation and also over a 24 h *in vitro* incubation, although incorporation into protein, at the expense of the other fractions, continued during the night. While primary productivity in the ice communities was still appreciable during Dec., the prominent synthesis of reserve glucan and the

decreasing cellular ratios of protein/carbohydrate suggests that the ice algae may be nutrient limited during this period. (Auth. mod.)

B-34829

Duhamel, G., Ozouf-Costaz, C., **Age, growth and reproductive biology of *Notothenia squamifrons* Gunther, 1880 from the Indian sector of the southern ocean,** *Polar biology,* 1985 4(3), p.143-153, Refs. p.152-153.

The growth of *Notothenia squamifrons* is analyzed using scale readings of specimens from various areas of the Indian Ocean. Spawning is annual and occurs during austral spring. Hatching takes place in summer. Scaling is set during the autumn. The smallest scaled fish measure 3.8 cm in total length. The fastest growth is observed around the Kerguelen Is., where the oldest specimens are 19 years old and reach 52 cm in total length, while at Crozet I., *N. squamifrons* does not live more than 12 years at a maximum length of 30 cm. Scale reading in fish from the Ob and Lena seamounts shows a minor decrease in growth during the winter season when compared to that in other areas. The hydrographical conditions of this sector of the southern ocean may, in part, explain these differences; especially temperature and plankton biomass seem to effect the growth rate. (Auth. mod.)

B-34830

Eastman, J.T., ***Pleuragramma antarcticum* (Pisces, Nototheniidae) as food for other fishes in McMurdo Sound, Antarctica,** *Polar biology,* 1985 4(3), p.155-160, Refs. p.159-160.

Nine species of notothenioid fishes were captured near the southern limit of their range in ice-covered McMurdo Sound. Stomach contents were examined using an occurrence method. Fishes were present in the diets of 8 of 9 species; *Dissostichus mawsoni* and *Gymnodraco acuticeps* were predominantly piscivorous. *Pleuragramma antarcticum* was the most common prey fish consumed, being present in stomachs of 4 of 8 species. *Pleuragramma* was also partially piscivorous (22%) as well as cannibalistic (13%). As evidenced by their presence in the stomach contents of other fishes, all life history stages from 20 mm SL postlarvae to 160 mm SL adult *Pleuragramma* were represented under the ice of the Sound. *Pleuragramma* was also a major food item for Weddell seals, birds and possibly invertebrates. As a widely distributed species in the pelagic zone, *Pleuragramma* may be an ecological substitute for euphausiids in the food web of the Sound. (Auth.)

B-34831

Hopkins, T.L., **Zooplankton community of Croker Passage, Antarctic Peninsula,** *Polar biology,* 1985 4(3), p.161-170, Refs. p.170.

Zooplankton species composition, abundance and vertical distribution were investigated in the upper 1000 m of Croker Passage during the austral fall, 1983. 106 species were identified, many being mesopelagic and reported previously from the southern ocean. The most numerous species were the copepods *Metridia gerlachei, Microcalanus pygmaeus, Oncaea antarctica* and *Oncaea curvata. Oncaea curvata* alone constituted half in the zooplankton population. Zooplankton biomass was dominated by three copepod species, *Metridia gerlachei, Calanoides acutus* and *Euchaeta antarctica,* which comprised 74% of the biomass. Size analysis revealed most of the zooplankton numbers were in the <1 mm fraction. The biomass distribution was polymodal with major maxima in the <1 mm and the 4-4.9 mm size classes. The <1 mm peak, exclusive of protozoans, was primarily copepod nauplii and copepodites of *Oncaea, Metridia* and *Microcalanus.* The 4-4.9 mm peak was mostly *Calanoides acutus* and *Metridia gerlachei.* All of the principal species had broad vertical distributions both day and night. *Euphausia superba* (17-52 mm) dominated the pelagic biomass, exceeding zooplankton standing stock under a square meter of ocean by a factor of 15. This is in contrast to lower latitudes where zooplankton biomass is usually greater than macrozooplankton-micronekton. (Auth. mod.)

B-34832

Branch, G.M., **Impact of predation by kelp gulls *Larus dominicanus* on the subantarctic limpet *Nacella delesserti*,** *Polar biology,* 1985 4(3), p.171-177, Refs. p.176-177.

The southern kelp gull *Larus dominicanus* derives about 45% of the mass of its marine diet from the limpet *Nacella delesserti* at Marion I. It selectively feeds on the largest limpets (35-65 mm)—a pattern most obvious in adult gulls—and eliminates about 19.6% of these limpets per year in the intertidal zone and in shallow waters, thus accounting for about 50% of the known annual mortality of limpets of this size. The gulls cannot forage for limpets in water more than 40 cm deep, and in the intertidal zone boulder-fields provide the limpets a refuge against the gulls. The gulls are also selective in feeding most often on limpets with pale shells. This alters the color composition of limpet populations in habitats where predation is most intense. (Auth. mod.)

B-34833

Czeczuga, B., **Light-harvesting phycobiliprotein pigments of the red alga *Leptosomia simplex* from the Antarctic,** *Polar biology,* 1985 4(3), p.179-181, 18 refs.

By means of Sephadex G-100 chromatography method, the phycobiliprotein content of antarctic red algae *Leptosomia simplex* was studied. The phycobiliproteins, R-phycoerythrin, R-phycocyanin and allophycocyanin were identified. The dominant pigment in this group was found to be R-phycoerythrin. (Auth.)

B-34834

Fricke, H., Gercken, G., Oehlenschläger, J., **1-O-alkylglycerolipids in antarctic krill *(Euphausia superba* Dana),** *Comparative biochemistry and physiology,* 1986 85B(1), p.131-134, 17 refs.

Krill contains 1-O-alkyllipids as minor components ranging from 0.3 to 0.6% of total lipid content. 1-O-alkyllipids were present in whole krill samples and in isolated abdominal muscle as well. In both phospholipids and neutral lipids the presence of 1-O-alkyllipids could be found. A number of 16 individual species of 1-O-alkylglycerols could be separated by GLC and identified using GLC/MS after enzymatic and chemical degradation of total lipids. The predominant alkyl chains found were: 16:0 (40.5-52.7%), 14:0 (10.9-13.0%) and 16:1 (8.3-11.8%, one of two isomers). 1-O-alk-1'-enyllipids (plasmalogens) and 2-O-alkyllipids were not detected. (Auth.)

B-34835

Watkins, J.L., Morris, D.J., Ricketts, C., Priddle, J., **Differences between swarms of antarctic krill and some implications for sampling krill populations,** *Marine biology,* 1986 93(1), p.137-146, Refs. p.145-146.

Krill, *Euphausia superba* Dana, were sampled from 28 discrete swarms in a small area southwest of Elephant I. over a period of 14 d (Feb.-Mar. 1985). Four biological characteristics of the krill (length, sex, moult, gut fullness) were examined in a study of variation between swarms. Analysis of these characteristics indicated extensive differences between swarms and no single characteristic, or combination of characteristics, emerged as consistently accounting for the observed heterogeneity. There was no relationship between the degree of heterogeneity and the physical or temporal proximity of swarms. The variability between even close swarms strongly suggests that swarms are the basic unit of organization of krill populations. This conclusion has important implications for sampling programs aimed at estimating population parameters. Thus, in the population studied here, it was calculated that it was necessary to

sample 23 swarms to estimate mean length and 10 swarms to establish a reliable estimate for the proportion of females in the population. (Auth.)

B-34839

Rosenberg, A.A., Beddington, J.R., Basson, M., **Growth and longevity of krill during the first decade of pelagic whaling,** *Nature,* Nov. 13, 1986 324(6093), p.152-154, 20 refs.

Krill has been the subject of study for many years. As the main prey species of the baleen whales, several species of seals and many sea birds, fish and cephalopod species, its importance within the ecosystem is clear. A knowledge of growth and longevity, which in krill are the subject of some controversy is required. Conflicting results have been obtained from krill size composition analysis, which indicates a short lifespan, and age pigment analysis, which indicates a longer life. Here are analyzed eight years of data on krill taken between 1928 and 1938 and estimates are obtained which consistently indicate high growth rates, modulated by a strong seasonal pattern. The cumulative growth through the year is therefore consistent with the studies of age structure using pigment analysis. (Auth.)

B-34843

Moe, R.L., Silva, P.C., **Sporangia in the brown algal genus *Desmaretsia* with special reference to antarctic *D. ligulata*** , *Japanese Society of Phycology. Bulletin,* Aug. 1977 Vol.25(Suppl), p.159-167, In English with Japanese summary. 24 refs.

A critical review of the literature on sporangia in *Desmarestia* revealed scanty but important information. Variation in sporangial development and disposition ranges from the direct metamorphosis of scattered superficial cortical cells to the production of an extensive raised sorus containing paraphyses. This variation calls for a reappraisal of presently used taxonomic criteria, which are based solely on vegetative characters. (Auth.)

B-34844

Kappen, L., Friedmann, I., **Cryptoendolithic lichens as an example of adaptation to an extremely dry, cold climate** [Kryptoendolithische Flechten als Beispiel einer Anpassung an extrem trocken-kalte Klimabedingungen], *Gesellschaft für Ökologie, Göttingen. Verhandlungen,* 1981 (pub. 1983) Vol.10, p.517-519, In German with English summary. 6 refs.

DLC QH540.G47a

In Antarctica the bare rocks of the Dry Valleys, Victoria Land, provide a large area for lichen colonization. However, rock surfaces are almost free of any plant life. The local abundance of cryptoendolithic lichens (lichen thallus totally inside the porous space of sandstone) shows that this life form allows the existence of plants under generally harsh environmental conditions. Lichen habitats are strictly exposure dependent. The microclimate in the colonized rock layers differs significantly from the outer environment of the rock. Optimum temperatures of net photosynthesis are between +2 and +9 C. On a calm day lichens are able to photosynthesize for about 13 hours at their habitat; however, temperatures were never observed to be optimal. Thus, dry matter production proves to be very low. Adaptation results here from qualities of the lichens as well as from the restriction of the lichen to a kind of micro-oasis. (Auth.)

B-34845

Jehl, J.R., Jr., Todd, F.S., Rumboll, M.A.E., Schwartz, D., **Notes on the avifauna of South Georgia,** *Gerfaut,* 1978 68(4), p.534-550, In English with Flemish and French summaries. 17 refs.

Results of a 3-week ornithological survey of South Georgia from numerous anchorages of R/V *Hero* are reported. Wandering Albatross colonies in the Bay of Isles contained only 163 pairs. The previously unsurveyed Macaroni Penguin colonies on the Willis Islands were estimated at 13 million birds, but this may be much too high. The King Penguin colony at the Salisbury Plain included 16,000 adults and large young, a marked increase since 1971. Several species rare on South Georgia were observed (Emperor Penguin, Adelie Penguin, Kerguelen Petrel) and two species (Fairy Prion, Arctic Tern) were reported for the first time. Preliminary studies indicate that the local breeding populations of Kelp Gull and Blue Petrel are morphologically distinct. The Fairy Prion differs slightly from specimens taken in the Falklands, the nearest breeding colony, suggesting the existence of an undiscovered population on South Georgia. The regular occurrence of large numbers of seabirds aboard ship at Elsehul but not at other anchorages along the north shore of South Georgia is presumptive evidence for the localized nature of breeding colonies on the main island. (Auth.)

B-34846

Shulenberger, E., Wormuth, J.H., Loeb, V.J., **Large swarm of *Euphausia superba:* overview of patch structure and composition,** *Journal of crustacean biology,* Nov. 1984 4(Spec No.1), p.75-95, 6 refs.

Twenty-five MOCNESS (Multiple Open/Closing Net and Environmental Sensing System) tows were taken in and around a large swarm of krill near Elephant Island. Krill from all 25 tows (201 samples) and the copepods from 9 tows (63 samples) have been analyzed. Significant agreement in rank order of abundance is found for both krill and nonkrill fractions. Most copepod species show significant covariation; there is less significant covariation among euphausiid categories. Larvae of *E. superba* and *Thysanoessa* spp. co-occur and show strong positive covariation. There are large day-night differences in catches of both adult and, to a lesser degree, larval euphausiids. Vertical boundaries between larval and adult krill are often sharp, and larvae may occur either above or below significant adult concentrations. (Auth.)

B-34847

Lipps, J.H., DeLaca, T.E., **Shallow-water foraminiferal ecology, Pacific Ocean,** Quaternary depositional environments of the Pacific coast. Pacific coast paleogeography symposium, 4th. Proceedings, edited by M.E. Field, Los Angeles, Society of Economic Paleontologists and Mineralogists, Pacific Section, 1980, p.326-340, 22 refs.

Included in this study of foraminiferal ecology are examples from shallow waters at McMurdo Sound, along the Antarctic Peninsula, at Islas de los Estados, Tierra del Fuego, at Enewetak Atoll, Marshall Islands, and at the Bodega Marine Laboratory in northern California. These environments, for the purposes of this paper, include intertidal, marsh, lagoon, estuary, reef and subtidal areas to depths of 45 meters. The foraminifera living in these environments are quite diverse. Within each environment, foraminiferal reproductive strategies, dispersal mechanisms, trophic roles, and morphologic adaptations can be quite distinct. Microhabitat differences in each region play an important role in foraminiferal abundance, species composition, and adaptive strategies. The purpose is not to document their distributions in each place but to provide examples of the ecologic occurrences of foraminifera that may aid paleontologic interpretation in general. (Auth. mod.)

B-34848

Thompson, L.B., **Distribution of living benthic foraminifera, Isla de los Estados, Tierra del Fuego, Argentina,** *Journal of foraminiferal research,* July 1978 8(3), p.241-257, 25 refs.

Four distinctive faunal assemblages, associated with depth (intertidal or offshore) and exposure to the open ocean (protected or exposed) are present in the study area. Faunal data were analyzed using Sanders rarefaction method, and each assemblage had a characteristic set of species richness values. The faunal associations are similar to others described previously from Argentina. One significant difference, however, is the presence in great numbers of *Rosalina globularis*. Such large numbers of this species have not been previously described. The protected intertidal assemblage has species richness values of 14 to 20, the exposed intertidal assemblage has species richness values of 24 to 28, the protected offshore assemblage has species richness values of 20 to 24, and the exposed offshore assemblage has the highest species richness values, 28 to 35. Dominant species in each assembly are noted. (Auth. mod.)

B-34849

Devillers, P., **Distribution and relationships of South American skuas,** *Gerfaut,* 1978 68(3), p.374-417, In English with Flemish and French summaries. 58 refs.

Two skuas of the *Stercorarius skua* superspecies breed in South America, *S. antarcticus* mainly in the Falklands, *S. chilensis* mainly in Fuegia and the Chilean Fjords. The interactions of the two forms and the limits of their respective ranges have been poorly known. Adult plumages, individual variation, including frequency distribution of plumage types, juvenile plumage and behavior, particularly the Long-Call performance, are considered. Details of these characteristics and the geographic distribution of these species are discussed at length. (Auth. mod.)

B-34850

Lapeyre, J.M., **Krill peeling machine,** *U.S. Patent Office. Patent,* July 19, 1983 8 col., USP-4,393,544, 2 refs.

A krill peeling machine is described and illustrated having a bank, or plurality of banks, of pairs of peeling rolls with peeling nips in between and with their major axes transverse to the path of flow of a supply of krill. There are means for oscillating the peeling rolls causing the nips to engage and peel the krill to provide a tail meat with shell removed. A krill leveling means is situated at the loading end of each peeling bank for distributing the krill evenly across the peeling nips of the transversely disposed rollers. Also located above the transversely disposed peeling rolls are krill longitudinal guide means which are spaced transversely along the major axes of the peeling rolls to maintain a uniform distribution of krill transversely of the axes of the peeling rolls. For shipboard installation these guides may be foraminous to permit passage of water to prevent krill from piling up on one side of the machine when the ship rolls, and to flush unpeeled krill down the length of the peeling and/or cleaning section along with peeled meat. (Auth. mod.)

B-34861

Gee, J.M., Fleeger, J.W., **Two new species of harpacticoid copepod from South Orkney Islands, Antarctica, and a redescription of *Idyellopsis typica* Lang (Tisbidae),** *Zoological journal of the Linnean Society (London),* Oct. 1986 88(2), p.143-165, 22 refs.

Two new species of harpacticoid copepod belonging to the families Ameiridae and Ancorabolidae are fully described and illustrated. *Pseudameria signyensis* n.sp. is very similar to *P. crassicornis* Sars but is distinguished from it by the presence of an extra seta on the inner border of the terminal segment of the endopodite of the fourth swimming leg. *Laophontodes macropodia* n. sp. is distinguishable from all other species in the genus by the setal formula of the first four swimming legs but more particularly by the unique shape of the fifth leg. *Idyellopsis typica* Lang is by far the most abundant harpacticoid inhabiting sublittoral fine sand in Borg Bay, Signy I. The female of this species is redescribed and the male described and illustrated for the first time. (Auth.)

B-34862

Rehbein, H., Danulat, E., Leineman, M., **Activities of chitinase and protease and concentration of fluoride in the digestive tract of antarctic fishes feeding on krill (*Euphausia superba* Dana),** *Comparative biochemistry and physiology,* 1986 85A(3), p.545-551, 26 refs.

Studies on the digestion of krill by *Notothenia rossii marmorata, Notothenia neglecta, Champsocephalus gunnari* and *Chaenocephalus aceratus* showed that these antarctic fish species are well equipped to feed on krill, as indicated by their high levels of chitinase and protease activity. Very high chitinolytic activities were determined in the stomach of the fish species. However, activities that were measured in intestine samples can be substantial, as well. Very strong protease activities were determined in samples of the stomach tissue and the intestinal contents. When krill were present in the guts, the concentrations of fluoride in the stomach and intestinal contents of *N. rossii marmorata* and *Ch. gunnari* were extremely high, while the tissues were practically devoid of fluoride. (Auth.)

B-34867

Vogel, M., **Distribution and ecology of epigeic invertebrates on the subantarctic island of South Georgia,** *Spixiana,* Dec. 30, 1985 8(2), p.153-163, 21 refs.

Collections of arthropods on the subantarctic island of South Georgia during the austral summers 1980/81 and 1981/82 showed that it is best regarded as an "archipelago" consisting of several biogeographical "islands" rather than a single biogeographical unit. The composition of the epigeic invertebrate fauna of nine areas including tussock stands, grass-heath communities and marsh-bog formations in Cumberland East Bay differs in quantity rather than quality. Only a few epigeic arthropods are strictly limited to specific areas. The carabid and staphylinid beetles inhabit warmer lowland areas and the lathridiid beetle inhabits *Poa flabellata* heads infected with fungi. The only parasitic hymenopteran, *Notomymar aptenosoma,* is rare and parasitizes eggs of perimylopid beetles. These beetles are the most important insects in the terrestrial ecosystems of South Georgia, both because of their absolute numbers and their role as decomposers. The ratio of parasitic/carnivorous arthropods to the rest of the winged insects was found to be 1:2.3. As predatory forms only the spiders may be of quantitative importance and their proportion of the total epigeic invertebrate fauna was 13-36%. (Auth.)

B-34868

Semina, G.I., Makarova, I.V., **Morphology and distribution of two bi-polar species of the genus *Thalassiosira* (Bacillariophyta)** [O morfologii i rasprostranenii dvukh bipoliarnykh vidov roda *Thalassiosira (Bacillariophyta)*], *Botanicheskiĭ zhurnal,* May 1983 68(5), p.611-618, In Russian. Refs. p.617-618.

Expanded diagnoses are presented for 2 diatom species of the genus *Thalassiosira, T. gravida* and *T. antarctica.* The diagnoses are based on electron microscopy study of the diatoms and data on their distribution.

B-34869

El-Sayed, S.Z., ed, **Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS newsletter, Vol.8, No.2,** College Station, Texas A and M University, Dec. 1986, 12p.

Discussions at the fifth meeting of the Commission for the Conservation of Antarctic Marine Living Resources and its Scientific Committee, held on Sep. 8-19, 1986, in Hobart, Australia, are summarized. They include the Headquarters agreement, cooperation with SCAR, new conservation measures, incidental mortality of marine animals caused by human-made debris, and fish stock assessment.

The Krill Physiology Data Analysis Workshop, held on Sep. 15-17, 1986, in Quebec, is reported. Covered are also news from the BIOMASS Data Center, the RRS *John Biscoe* biological cruise 1986-1987, the CCAMLR Ecosystem Monitoring Program, India's Sixth Expedition to Antarctica, South Africa's BIOMASS news, Chinese antarctic research, Australia's antarctic marine science activities, and the R/V *Polarstern* Weddell Sea winter cruise.

B-34872

Cannon, R.J.C., **Effects of contrasting relative humidities on the cold tolerance of an antarctic mite,** *Journal of insect physiology,* 1986 32(6), p.523-534, 30 refs.

Samples of adult *Alaskozetes antarcticus,* an antarctic cryptostigmatid mite, were collected in winter and summer. In 4 separate experiments, mites were maintained under relative humidities in the range: 0, 26, 42, 55, 86 and 100% at 4C. Changes in cold hardiness (measured as supercooling points, body water contents, cryoprotectants and percentage survival) and live weights were monitored for up to 93 days. Under saturated conditions, winter-collected mites showed a gradual loss of cold hardiness with increased supercooling points and substantial loss of glycerol. For mites kept in dry conditions (<55% r.h.), glycerol levels were relatively high, and supercooling points remained mainly unchanged, despite large decreases in live weight and body water content. Under desiccating conditions, glycerol accumulation was directly related to the rate of water loss. For summer-collected mites, rapid increases in cold hardiness occurred as a result of starvation, but the extent of these increases was proportional to the saturation deficit: i.e. supercooling ability increased most under the driest conditions. These findings are discussed in relation to theories concerning the relative proportions of bound and bulk water, and support the hypothesis that potential nucleators are present throughout the year in such freezing-susceptible species. (Auth.)

B-34873

Worland, M.R., Block, W., **Survival and water loss in some antarctic arthropods,** *Journal of insect physiology,* 1986 32(6), p.579-584, 17 refs.

Seven species of Antarctic micro-arthropods (4 mites and 3 collembolans) were examined to determine their resistance to dehydration and their survival under dry conditions. Water loss at r.h. 5% at temperatures in the range -10 to 45C was measured gravimetrically using a recording micro-balance. Survival of samples of mites was monitored after exposure to r.h. 5% and temperatures in the range 0-20C. Rates of water loss ranged from 0 to 30% fresh weight/h depending on temperature and species. The 3 Collembola were least resistant and the 2 oribatid mites were most resistant to dehydration under the experimental conditions. The optimal survival temperature of the mite *Alaskozetes antarcticus* was around 10C under 5% r.h.; there were no significant diferences in rate of water loss between temperatures. Results are discussed in terms of possible control mechanisms and the type of habitat occupied by each species. (Auth.)

B-34876

Davaine, P., **Subantarctic freshwater** [Eaux douces subantarctiques], Travaux français en limnologie. Edited by R. Lesel. International Association of Theoretical and Applied Limnology. 22nd Congress, Lyon, France, 1983, Lyon, Societas Internationalis Limnologiae, Aug. 1983, p.219-227, In French and English. 55 refs.

Scientific expeditions that followed one another since 1840 in the French Southern Islands allowed to draw up a fairly exhaustive inventory of their fauna and flora. Since the establishment in 1951 of a permanent station on Kerguelen Is. and the opening of a freshwater biology laboratory in 1970, research has had a more ecological approach. It deals with structure and functioning of aquatic ecosystems and emphasizes studies of acclimatized Salmonid populations and their relationships with the environment. (Auth.)

B-34878

Rodhouse, P.G., **Growth and distribution of young *Mesonychoteuthis hamiltoni* Robson (Mollusca: cephalopoda): an antarctic squid,** *Vie et milieu,* 1985 35(3/4), p.223-230, In English with French summary. 23 refs.

DLC QH91.A1V5

Thirty seven juvenile specimens and one adult specimen of the cranchiid squid *Mesonychoteuthis hamiltoni* were captured by the opening and closing RMT8 net during RRS *Discovery* cruise 100 (1979) in the southern ocean. The collection extends the size range of juveniles of this species previously described and illustrated. The small specimens resemble small juveniles of *Galiteuthis glacialis,* several characteristics of which are described. All specimens of *M. hamiltoni* were captured to the south of the Antarctic Convergence, and most were captured at depths between 20 m and 500 m apparently concentrated in the upper zone of 'Warm Deep Water' beneath the surface layer. Four newly hatched specimens were caputred at 55 35'S between 20 and 500 m. The adult specimen was captured in a haul which had sampled a depth horizon from 2,000 m to 2,200 m. (Auth.)

B-34879

Feiler, K., **New metacercaria of Gymnophallus sp. and its frequency distribution in *Patinigera polaris* of the South Shetlands (Antarctica)** [Eine neue Gymnophallus-Metacercarie und ihre Häufigkeitsverteilung in *Patinigera polaris* der Südshetlands (Antarktis)], *Angewandte Parasitologie,* 1986 Vol.27, p.227-240, In German with English summary. 24 refs.

During the period July 1981 to November 1981, 474 specimens of the limpet *Patinigera polaris* were examined for parasites in the area of the Soviet Bellingshausen Station. In the present paper a new *Gymnophallus* metacercaria is described from the limpet. The incidence and mean intensity of infection ranged between 59.5% and 100.0% and between 1.32 and 14.53, respectively. The observed frequency distribution of parasite counts is overdispersed, the negative binomial distribution providing a good empirical model for their description. The results are discussed and it is proposed to use the variation in the frequency distribution of the metacercaria as an ecological indicator for the area. (Auth.)

B-34888

Parfenovich, S.S., **Hydrological indices for the differentiation of the range of antarctic krill,** *Polar geography and geology,* Jan.-Mar. 1986 Vol.10, p.50-54, 8 refs. For Russian original see 15B-33409.

With a view to planning optimal utilization of the antarctic krill resource, the author has identified within the total range of *Euphausia superba* a belt of accessible krill distribution, zones and subzones of concentrated occurrence and finally localized regions of high krill concentration. Each of these areal units is defined on the basis of oceanographic or geographical parameters. The regions, numbering 22 in all, may be subdivided into those near islands, those near the continental coast, frontal regions and those over sea-bed rises. (Auth.)

B-34889

Sorokina, T.A., Abyzov, S.S., **Pseudomonas genus of bacteria isolated from Antarctic ice sheets** [Bakterii roda Pseudomonas iz lednikovoĭ tolshchi Antarktidy], *Akademiia nauk SSSR. Seriia biologicheskaia,* July-Aug. 1986 No.4, p.494-504, In Russian. Refs. p.502-504.

Five strains of Pseudomonas bacteria were found in Central Antarctica near Vostok Station at depths of 79-81 m and 91-92 m, corresponding to ice ages of 2100 and 25000 yrs, respectively. Besides green fluorescent pigments the bacteria also produce a brown melanin-like substance. Basic characteristics and possibilities of bacteria introduction into ice are discussed.

B-34890

Legaz, M.E., Diaz-Santos, E., Vicente, C., **Lichen substrates and urease production and secretion: a physiological approach using four antarctic species,** *Biochemical systematics and ecology,* 1986 14(4), p.375-379, 24 refs.

Ramalina terebrata, C. regalis and *S. alpinum* produce urease in response to urea exogenously supplied. Enzyme activity is abolished by including 300 micron cycloheximide in the incubation media. Urease is affected by feed-back inhibition when ammonia is accumulated in the thalli. *Lecania brialmontii* has a constitutive urease which is strongly inhibited by an excess of urea. The enzyme is secreted to the media as a function of the soil in which lichens survive. (Auth.)

B-34891

Higgins, R.P., **Redescription of the *Echinoderes pilosus* (Kinorhyncha: Cyclorhagida),** *Biological Society of Washington. Proceedings,* Oct. 17, 1986 99(3), p.399-405, 18 refs.

Echinoderes pilosus Lang is redescribed from a paratypic male and female collected from kelp washed onto a beach at South Georgia. The presence of lateroventral adhesive tubes on the fourth segment, patterns of cuticular hairs, scars, and sensory spots, and the morphological differences between the sexes are noted. The species is compared with other species having the same spine formula. (Auth.)

B-34895

Hughes, J.M.R., **Relations between aquatic plant communities and lake characteristics on Macquarie Island,** *New Zealand journal of botany,* 1986 24(2), p.271-278, 30 refs.

Five lakes at the northern end of subantarctic Macquarie Island were sampled for water quality, substrate characteristics, and vegetation. Two lakes have nutrient-rich waters and organic substrates. The other three lakes are oligotrophic with coarse inorganic substrates. *Myriophyllum triphyllum* Orchard is widespread in the nutrient-rich lakes, along with aquatic bryophytes and algae. Aquatic angiosperms are mostly absent from the oligotrophic lakes. It is suggested that the greater biomass in some of the lakes is due to nutrients derived from deposition of sediment from the surrounding basin. (Auth.)

B-34903

Harrisson, P.M., Walton, D.W.H., Rothery, P., **Effects of temperature and moisture on dark respiration in the foliose lichen *Umbilicaria antarctica,*** *New phytologist,* 1986 Vol.103, p.443-455, 34 refs.

The dark respiration of field-fresh thalli of *Umbilicaria antarctica* Frey et Lamb is reported for temperatures from -5.5 to 19 C, and water contents from saturation to dryness. Detailed analysis of the respiratory response with changing water content has suggested that Michaelis-Menten kinetics appear to provide a useful model. *Q10* values are used to indicate possible ice formation in the thallus and water loss characteristics are explained in terms of thallus anatomy. The ecological implications of this approach are discussed. (Auth.)

B-34904

Pribble, J., Hawes, I., Ellis-Evans, J.C., **Antarctic aquatic ecosystems as habitats for phytoplankton,** *Biological reviews,* 1986 Vol.61, p.199-238, Refs. p.233-238.

Phytoplankton in Antarctic seas and lakes are subject to the same laws governing their behavior as those controlling algae in other aquatic environments. However, both ecosystems present extremes of conditions, which influence profoundly the success of phytoplankton. For instance, temperatures are consistently low and the great year-round variation in radiation climate is further exacerbated by winter ice-cover. This paper assesses both ecosystems as habitats for phytoplankton, using comparisons between the two ecosystems where possible as these often prove more informative than consideration of the systems in isolation. (Auth.)

B-34912

Jackson, S., **Assimilation efficiencies of White-chinned petrels *(Procellaria aequinoctialis)* fed different prey,** *Comparative biochemistry and physiology,* 1986 85A(2), p.301-303, 26 refs.

Mean assimilation efficiencies (AE) of 5 White-chinned petrel fledglings fed on light-fish, squid, and krill were 77.9, 74.4 and 76.0%, respectively. After correction for nitrogen retention, AEn values decreased to 69.1% for light-fish, 68.0% for squid, and 67.5% for krill. Differences in AE for different prey types may result from differential nitrogen content of the prey tissue. Assimilation efficiency values for fish and squid of a specialized feeder, the Jackass penguin, differ more than the AEs of White-chinned petrels for these food types. The generalized diet of the White-chinned petrel may account for this species' ability to assimilate widely different prey types with similar efficiencies. (Auth.)

B-34913

McClintock, J.B., Pearse, J.S., **Organic and energetic content of eggs and juveniles of antarctic echinoids and asteroids with lecithotrophic development,** *Comparative biochemistry and physiology,* 1986 85A(2), p.341-345, 28 refs.

Egg diameters (mm) of the spatangoid echinoids *Abatus shackletoni, Abatus nimrodi* and the asteroids *Notasterias armata, Diplasterias brucei,* and *Perknaster fuscus antarcticus* were 1.28, 1.97, 3.54, 2.80 and 1.20, respectively. *A. shackletoni, A. nimrodi, N. armata* and *D. brucei,* brood their embryos to a juvenile stage; *P. fuscus antarcticus* apparently is a broadcast spawner with pelagic lecithotrophic larvae. Eggs were composed primarily of protein (33-53%) and lipid (36-59%). Juveniles had higher levels of insoluble protein and ash due to the formation of structural and skeletal material. There was little decrease in the amount of energy from egg to juvenile during development. This supports the hypothesis that large egg size in marine invertebrates with lecithotrophic development is more important in producing a large juvenile than in the provision of a large amount of energy for development. Comparisons of reproductive output and reproductive effort in echinoderms with lecithotrophic development reveal a high degree of interspecific variability. This variability is related to the differential allocation of energy to somatic and gametic tissues based on differences in functional morphologies. Variable reproductive efforts in species with lecithotrophic development confound comparisons with species with planktotrophic development and make tests of energetic hypotheses for alternate life-history strategies in marine invertebrates difficult. (Auth.)

B-34916
Blot, M., Soyer, J., Thiriot-Quievreux, C., **Preliminary data on the genetic differentiation of *Mytilus desolationis* Lamy 1936 and *Aulacomya ater regia* Powell 1957 (Bivalvia, Mytilidae) in the Kerguelen Islands (Terres Australes et Antarctiques Françaises),** *Polar biology,* 1987 7(1), p.1-9, Refs. p.8-9.

Mussel populations in the Kerguelen Is. constitute an excellent model in which to study genetic differentiation. Enzyme polymorphism and the electrophoretic variability of some loci have been studied in 4 populations of *Mytilus desolationis* Lamy 1936 and in 4 other populations of *Aulacomya ater regia* Powell 1957. In both species 67% of the loci were polymorphic. For *M. desolationis* the 4 populations studied were found to be heterogeneous; 4 loci contribute clearly to this differentiation. The populations from sheltered and exposed areas were distinguishable on the basis of the allelic frequencies of LAP-1 and LAP-2. The allelic frequencies of PGI and PGM allow further differentiation of the populations. For *A. ater regia* the 4 populations studied were distinguishable on the basis of the allele frequencies of ACP-2 and LAP-1 and the differences could not actually be related to their environmental conditions. (Auth.)

B-34917
Wägele, J.-W., **On the reproductive biology of *Ceratoserolis trilobitoides* (Crustacea: Isopoda): Latitudinal variation of fecundity and embryonic development,** *Polar biology,* 1987 7(1), p.11-24, Refs. p.23-24.

The embryonic development of *Ceratoserolis trilobitoides* (Crustacea: Isopoda) is described. It is estimated that breeding lasts nearly 2 years. In comparison with non-polar isopods 3 causes for the retardation of embryonic development are discussed: genetically fixed adaptations to the polar environment, the physiological effect of temperature and the effect of egg size. The latter seems to be of minor importance. Intraspecific variations of fecundity are found in populations from the Weddell Sea, the largest eggs occur in the coldest region. The distribution of physiological races corresponds to the distribution of morphotypes. (Auth.)

B-34918
Broady, P.A., **Morphology, distribution and ecology of *Pseudococcomyxa simplex* (Mainx) Fott (Chlorophyta, Chlorellaceae), a widespread terrestrial antarctic alga,** *Polar biology,* 1987 7(1), p.25-30, Refs. p.29-30.

Previous antarctic records of *Pseudococcomyxa simplex* are summarized and, together with new records, the alga is shown to have a circumpolar distribution in terrestrial habitats. It has been encountered over a latitudinal range of 54 to 77 S in subantarctic, maritime and coastal continental Antarctica, from sea level to an altitude of 3600 m. The alga has been observed in grassland soils, as an epiphyte on a variety of mosses, in lithosols, in volcanic fumarolic soils and as a chasmoendolithophyte. A previous misidentification of this alga as *Monodus subterraneus* Boye Pet. is corrected. The morphology of antarctic specimens is described using light and electron microscopy, the latter for the first time with this alga. Antarctic and European specimens are shown to be almost identical. It is concluded that culture studies of wide-ranging samples from antarctic terrestrial habitats will probably reveal additional cosmopolitan species. (Auth.)

B-34920
Tilzer, M.M., Dubinsky, Z., **Effects of temperature and day length on the mass balance of antarctic phytoplankton,** *Polar biology,* 1987 7(1), p.35-42, Refs. p.41-42.

Photosynthesis and respiratory carbon losses of freshly collected phytoplankton were measured in incubators at 5 temperatures between -2 C and 8 C. The results are used to predict daily growth rates and to define temperature and daylength boundary conditions under which the net balance between photosynthesis and respiration would be positive and allow increases in standing stock. Model calculations suggest that under ample light energy supply during long summer days, potential daily growth rates are not severely affected by the low temperatures prevailing in the southern ocean. If energy supply is restricted by short days and deep water column mixing, substantially reduced respiration rates at low temperatures may allow the algae to survive. (Auth.)

B-34921
Adelung, D., Buchholz, F., Culik, B., Keck, A., **Fluoride in tissues of krill *Euphausia superba* Dana and *Meganyctiphanes norvegica* M. Sars in relation to the moult cycle,** *Polar biology,* 1987 7(1), p.43-50, Refs. p.49-50.

The fluoride content of whole animals and different tissues of the euphausiid species *Euphausia superba* and *Meganyctiphanes norvegica* was analyzed by two different and improved methods of isolation and determination. In contrast to other authors our findings show that the internal organs (muscle, hepatopancreas and hemolymph) contain less than 6 ppm d.w. fluoride this being the same order of magnitude as for vertebrates. Over 99% of the total fluoride content is located in the cuticle (i.e. integument) of the euphausiids (2600 ppm d.w. in *E. superba* and 3300 ppm d.w. in *M. norvegica* in pleon cuticle). Analysis of fluoride levels in relation to the moulting cycle showed that the uptake in both euphausiids occurs at a comparable and fast rate during the same physiological phase shortly after moult, parallel to the general construction of the cuticle. The internal organs show homeostasis in respect to fluoride. Accordingly, no internal deposition takes place, and fluoride is reaccumulated from the external medium at each moult. (Auth. mod.)

B-34922
Adams, N.J., Wilson, M.P., **Foraging parameters of gentoo penguins *Pygoscelis papua* at Marion Island,** *Polar biology,* 1987 7(1), p.51-56, Refs. p.56.

The foraging parameters of breeding gentoo penguins *Pygoscelis papua* were measured at Marion I. Mean swimming speed was 7.9 km/h. Penguins spent on average 8.1 h away from the colony, if they returned on the same day they left, and 23.7 h away if they remained at sea overnight. 16% of the total time away at sea was spent swimming. Time spent swimming, and distance travelled during a foraging trip, were highly variable and showed significant intercolony differences. 80% of all foraging trips totalled less than 40 km. Meal sizes were small and there was no correlation between meal size and distance travelled, suggesting a low availability of food. Prey items in the diet consisted mainly of the benthic shrimp *Nauticaris marionis* and the demersal fish *Notothenia squamifrons.* On evidence from stomach contents and the distances the penguins travelled, it is suggested that *Nauticaris marionis* has a more restricted distribution around Marion I. than *Notothenia squamifrons.* The concentration of gentoo penguin breeding colonies along the east coast of Marion I. and the south-east coast of Prince Edward I. may be attributable to favorable feeding conditions between the two islands. (Auth.)

B-34928
Kuwano, K., Sakamaki, C., Mitamura, T., Yoshida, T., **Physical and chemical properties of antarctic krill chitin. (Nutritional properties as a dietary fibers of antarctic krill chitin. Part 1),** *Agricultural Chemical Society of Japan. Journal,* 1986 60(11), p.913-920, In Japanese with English summary. 23 refs.

The apparent volume (ml/g) of the examined chitin for antarctic krill was 23.3. A negative correlation was found between the appar-

ent volume and carapace thickness. Krill chitin had a high apparent volume (low density), high settling volume in water (mg/g) and water-holding capacity (g/g). These properties reflect small body size and the thin carapace of antarctic krill. Scanning electron micrographs show no differences between surfaces of krill chitin and other chitins. In the samples, a correlation of 0.695 was found between the apparent volume of chitin and total adsorbed quantity (mg/g) of 11 food dyes (Japanese Standards of Food Additives under the Food Sanitation Law). The quantities of dyes adsorbed in chitins obtained from the antarctic krill, fleshy prawn and spiny lobster differed from the regression line. In patterns of ratios of dye adsorption, a large difference was present between the antarctic krill chitin and other chitins. (Auth. mod.)

B-34936

Thorne, R.F., **Antarctic elements in Australasian rainforests,** *Telopea,* 1986 2(6), p.611-617, Refs. p.615-617.

The interpretation of the three major Hookerian elements in the flora of Australia has changed significantly with the acceptance of plate tectonics. Like the xeromorphic Australian and tropical Indo-Malayan elements, the antarctic elements are still recognizable in Australia, especially in temperate and montane rainforests. Also like many of the former, the antarctic elements are actually Gondwanic and many even of autochthonous Australasian origin. The antarctic elements of Australasian rainforests are identified, and their spectacular disjunction explained in part on a vicariance, plate-tectonic basis. Various Australasian animal groups with similar trans-Antarctic connections with South America are briefly listed. The probability that some of the more vagile plant disjuncts have achieved their disjunctions via long-distance dispersal is considered, and a limited attempt is made to identify the Gondwanic origins of various antarctic rainforest elements as either East or West Gondwanic. (Auth.)

B-34937

Yamaguchi, K., **Supercritical carbon dioxide extraction of oils from antarctic krill,** *Journal of agriculture and food chemistry,* 1986 34(5), p.904-907, 18 refs.

Supercritical carbon dioxide extraction of the antarctic krill yielded oils that were composed solely of nonpolar lipids, largely triglycerides, without phospholipids. The extracted oils were fluid and of red color due to astaxanthin, which tended to be decomposed at temperatures higher than 60 C and a fixed pressure of 250 kg/sq cm. Analyses of the fatty acids showed a comparatively high proportion of eicosapentaenoic acid (11%). These results indicate that supercritical carbon dioxide is effective in obtaining nonpolar lipids from the krill by only one-step extraction and in excluding phospholipids that interfere with the utilization of krill oils. (Auth.)

B-34939

Altringham, J.D., Johnston, I.A., **Energy cost of contraction in fast and slow muscle fibres isolated from an elasmobranch and an antarctic teleost fish,** *Journal of experimental biology,* 1986 Vol.121, p.239-250, Refs. p.248-250.

Single fast and small bundles of slow fibres were isolated from the muscles of an elasmobranch (dogfish, *Scyliorhinus canicula)* and an antarctic teleost *(Notothenia neglecta).* A third fibre type present in the dogfish (superficial fibre) was also isolated. In the antarctic species, both tension and ATPase activity of the fast fibres were higher than those of the slow fibres, and the slow fibres were 30% more economical than fast fibres. After correction for differences in myofibrillar density, tensions were very similar. The results are discussed with reference to the energy supply, recruitment pattern and function of the various fibre types. (Auth. mod.)

B-35010

Parker, B.C., Simmons, G.M., Jr., **Blue-green algal mats—living stromatolites—from frigid light-limited antarctic lakes,** *Trends in biochemical sciences,* June 1981 6(6), p.3-4, 11 refs.

Algal mats, dominated by the prokaryotic blue-green alga *Phormidium frigidum* (Fritsch), have been discovered in great abundance attached to the bottom of dimly lit, permanently ice covered lakes in remote antarctic dry valleys. These algal mats grow, bind sediment and precipitate select minerals (e.g. carbonates) to form annual or seasonal laminae. In these respects they probably resemble some stromatolites which dominated the aquatic and/or marine biota on earth during the Precambrian era, first appearing in the fossil record approximately 3 billion years ago.

B-35012

Parkinson, A.J., Scott, E.N., Muchmore, H.G., **Rapid micromethod for preparation of enzyme-antibody conjugates,** *Journal of clinical microbiology,* Apr. 1982 15(4), p.737-739, 7 refs.

A rapid method is described for labeling antibody with alkaline phosphatase by a one-step glutaraldehyde linkage. The method involves the centrifugation of a small volume of an enzyme and antibody mixture through a minicolumn packed with hydrated Sephadex. This procedure rapidly removes ammonium sulfate and glutaraldehyde from the enzyme-antibody without significant dilution. This study has relevance to research conducted on adult subjects at Amundsen-Scott Station. (Auth. mod.)

B-35013

Castellini, M.A., Somer, G.N., **Buffering capacity of vertebrate muscle: correlations with potentials for anaerobic function,** *Journal of comparative physiology,* 1981 Vol.143, p.191-198, 29 refs.

Buffering capacities (beta) due to non-bicarbonate buffers, were measured in locomotory muscles from a variety of terrestrial and marine mammals and teleost fishes. The highest buffering capacities were found in muscles capable of either intense, burst glycolytic function or prolonged, low-level anaerobic function. Marine mammals had higher muscle buffering capacity on the average than terrestrial mammals. Among the fishes studied, warm-bodied species had the greatest (beta) values of all animals examined. Among the vertebrates considered are Weddell and elephant seals and Adélie penguins. (Auth. mod.)

B-35019

Green, K., **Food of the Cape Pigeon *(Daption capense)* from Princess Elizabeth Land, East Antarctica,** *Notornis,* Sep. 1986 33(3), p.151-154, 21 refs.

Regurgitated food was collected from 73 Cape pigeons nesting on coastal islands of Princess Elizabeth Land. Fish and euphausiids were the main food items, totalling more than 99% of the food by weight. The main euphausiid was *Euphausia superba.* (Auth.)

B-35020

Mamaeva, N.V., **Composition and distribution of planktonic infusorians in the Pacific sector of the Antarctic,** *Marine biology,* Jan.-Feb. 1986 (Pub. Nov. 1986) 12(1), p.17-20, Translated from Biologiia moria. 13 refs.

The complex hydrodynamic and hydrochemical regime of the Pacific sector of the Antarctic is reflected in the huge mosaic pattern in the distribution of infusorians, where members of the genus *Strombidium* predominate. The highest biomass was observed in the regions of the Antarctic Divergence and local upwellings (8.5 and 14.1 g/sq m, respectively), and the lowest in the Antarctic Circumpolar

Current. On the whole, the average infusorian biomass comprised 3.2 g/sq m for the region. (Auth.)

B-35021

Fullagar, P.J., Van Tets, G.F., Bartle, J.A., **Identification of Soft-plumaged petrel wings found on Macquarie Island,** *Notornis,* Sep. 1986 33(3), p.167-170, 12 refs.

The purpose of this note is to draw attention to the characters by which two rather similar petrels can be distinguished from limited material. Headless and much-decomposed carcases are often the only remains recovered for identification. Remains from Macquarie Island are described: identified as Kerguelen Petrel *(P. brevirostris),* they consist of a fully feathered left wing and a right wing with some pectoral bones collected by N.P. Brothers on Jan. 27, 1979 at Saddle Point. This material was of a single bird, quite possibly the remains of predation by the Southern Great Skua *(Stercorarius skua lonnbergi).* (Auth.)

B-35025

Hochachka, P.W., **Balancing conflicting metabolic demands of exercise and diving,** *Federation proceedings,* Dec. 1986 45(13), p.2948-2952, 16 refs.

During enforced diving, aquatic animals activate a set of physiological reflexes (apnea, bradycardia, peripheral vasoconstriction), which are termed the diving response and are in effect the first line of defense against hypoxia. At least in the Weddell seal, this strategy is now known also to be used in voluntary diving at sea, but the response is necessarily modified to accommodate potentially conflicting demands of diving and swimming exercise. The required regulation of O2 delivery is achieved at least in part by a well-paced release of oxygenated red blood cells, stored at the beginning of the dive apparently in the spleen. The main metabolic difference between laboratory and voluntary diving is that, in the latter, working muscles serve as a sink for lactate and thus the entry rates of lactate into the plasma can be balanced by exit rates from the plasma; the maintenance of this balance means that no excess lactate remains for a lactate washout in postdiving exercise except under long, exploratory diving. Even in the latter long dives, however, the amount of lactate formed is far less than would be expected if the energetic shortfall caused by hypoperfusion and O2 lack were made up by anaerobic glycolysis (Pasteur effect). Consequently, during diving, hypoperfused tissues necessarily sustain a metabolic arrest of variable degree as a mechanism of defense against hypoxia. (Auth. mod.)

B-35026

Steele, W.K., Klages, N.T., **Diet of the blue petrel at subantarctic Marion Island,** *South African journal of zoology,* July 1986 21(3), p.253-256, 19 refs.

Food samples were collected from 49 blue petrels *Halobaena caerulea* at Marion I. in the subantarctic region. These were analyzed and the results compared with previously published data collected at other islands. Crustaceans formed the major prey by mass (59.5%) and frequency (100%), with *Euphausia vallentini* being of particular importance (56.6% by mass of Crustacea). Other prey included fish, cephalopods and two species of insects, a moth (Noctuidae) and an assassin bug *Nabis.* (Auth.)

B-35028

Report of the Meeting of the SCAR Group of Specialists on Seals, San Diego, California, June 11-13, 1986, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* Jan. 1987 No.50, 32p.

The following was discussed at the meeting: The status of each of the chapters of the Handbook on Seal Research Methods—status, title and name of coordinator of each chapter being presented; the Convention for the Conservation of Antarctic Seals, with review of returns and of status of stocks; progress reports from various pinniped research projects, presenting synopses of activities by South Africa, the United States, Australia, Japan, West Germany, Chile, and the United Kingdom; the coordinated pinniped studies, including the southern elephant seal census and the antarctic fur seal census on antarctic and subantarctic islands. Thirteen appendixes consist of the list of participants, the agenda, a list of documents circulating during the meeting, and 10 short progress reports by individual researchers concerning their activities.

B-35033

Eastman, J.T., DeVries, A.L., **Renal glomerular evolution in antarctic notothenioid fishes,** *Journal of fish biology,* 1986 Vol.29, p.649-662, Refs. p.660-662.

Light and electron microscopy used to document the degree of glomerular development in antarctic notothenioid fishes revealed that 16 of 20 species inhabiting subzero sea water were aglomerular. One subantarctic and two temperate species were pauciglomerular. Arterial perfusion of Microfil demonstrated that arteries supplying aglomerular and pauciglomerular kidneys were confined largely to the periphery of the organ, and glomerular capillaries were absent or few in number. As ancestral notothenioids probably had glomerular kidneys, data from 20-25% of the fauna suggest that there has been an evolutionary loss of glomeruli in many species. The pattern of glomerular reduction is consistent with the hypothesis that the selective advantage of aglomerularism is in the urinary conservation of small molecular weight antifreeze glycopeptide compounds that are vital to survival in sub-zero antarctic waters. (Auth. mod.)

B-35034

McAdam, J.H., **Growth and production of *Cortaderia pilosa* (Gramineae) community in the Falkland Islands,** *Grass and forage science,* Dec. 1986 41(4), p.281-287, 14 refs.

Above ground production of a typical *Cortaderia pilosa* dominant sward in the Falkland Is. was estimated over one growing season by summing significant positive increments in total dry matter (DM) production of various sward components and by sequential cutting to ground level. The standing crop was characterized by a high proportion of standing dead matter at all times of the year. Net herbage production was estimated as 2200 kg/ha and 1440 kg/ha by the 'difference' and 'sequential cutting' techniques, respectively. The pattern of leaf growth was determined on another site by regular linear measurements of a population of physiologically similar *C. pilosa* leaves. There was very little early season growth and most of the DM was produced in a short period in the middle part of the growing season. The implications of these findings are briefly discussed in relation to the increased utilization of *C. pilosa* by improved pasture management. (Auth. mod.)

B-35047

DeLaca, T.E., **Determination of benthic rhizopod biomass using ATP analysis,** *Journal of foraminiferal research,* Oct. 1986 16(4), p.285-292, 37 refs.

Investigations have been conducted to determine the feasibility of using ATP as a biomass indicator for two rhizopod species *(Astrammina rara* and *Gromia oviformis)* with differing test compositions. Highly significant relationships emerged between organism wet weight and ATP concentration. A survey of four different nucleotide extraction procedures, including cold acids and boiling buffers, revealed no significant differences. Significant correlations exist between organism ATP and carbon content. Chemical compositions (carbon, nitrogen, % protein, % lipid, and % carbohydrate) of these species are shown and differences noted between protoplasm and structural (test) organics. This analytical procedure allows accurate biomass measurement and normalization of data obtained in these studies. (Auth. mod.)

B-35048

Urakaze, M., **Infusion of emulsified trieicosapentaenoyl-glycerol into rabbits: the effects on platelet aggregation, polymorphonuclear leukocyte adhesion, and fatty acid composition in plasma and platelet phospholipids,** *Thrombosis research,* Dec. 1, 1986 44(5), p.673-682, 23 refs.

After synthesizing 1,2,3-trieicosapentaenoyl-glycerol (EPA-TG), an emulsion of EPA-TG with purified phosphatidyl-choline from krill as an emulsifier was manufactured. After two intravenous injections of the EPA-TG emulsion into rabbits, the EPA content in plasma and platelet phospholipids increased markedly. In control experiments, which were performed in exactly the same manner except the soybean oil emulsion was used instead of the EPA-TG emulsion, there were almost no significant changes. It is suggested that an EPA-TG emulsion is applicable to patients who need intravenous alimentation and preventive care of thrombosis, such as postoperative patients. (Auth. mod.)

B-35049

Brown, P.A., **Key to the genus *Pentamyzus* Hille Ris Lambers (Homoptera, Aphididae), with a description of a new species from the Falkland Islands,** *Systematic entomology,* Jan. 1987 12(1), p.1-6, 4 refs.

A key to the apterous viviparous females of the genus *Pentamyzus* is given and the host plants of the four known species are discussed. *P. tenuis* sp.n., which exhibits a highly specialized grass-feeding morphology, is described from *Poa alopecurus* in the Falkland Islands. (Auth.)

B-35055

Denys, C.J., **Visual pigment and photoreception of the antarctic krill, *Euphausia superba* (Crustacea, Euphausiacea),** Chicago, De Paul University, 1981, 248p., University Microfilms order No. 81-26310, Ph.D. thesis. Refs. p.237-248.

The findings of this thesis are based on a thorough literature review and on spectroscopic studies. It is found that the structure of the rhabdom of *Euphausia superba* is straightforward: the rhabdom is fused, and consists of alternating layers of orthogonally-oriented microvilli contributed by seven retinula cells. There is a conical refractive element at both the distal and proximal ends of each rhabdom. The distal refractive element is continuous with an axial filament which can be traced distally to the proximal end of the crystalline cone. At 10 C, the rhodopsin is stable both in the presence and absence of hydroxylamine. In contrast to other rhodopsins, from both vertebrates and invertebrates, the rhodopsin of *E. superba* undergoes dark pH-dependent spectral changes. These changes probably reflect the de-protonation of the Schiff-base linkage at alkaline pH, and are reversible. Metarhodopsin I is also unstable outside of a relatively narrow pH range near neutrality. The combined screening effects of the two ommochrome pigments in the eye may account for the wide plateau in behavioral spectral sensitivity observed when determining the phototactic response of *E. superba* to light of various wavelengths and intensities. In the behavioral studies, there is no distinct peak which can be associated with the blue-green color of their bioluminescence (approximately 476 nm). (Auth. mod.)

B-35061

Moe, R.L., ***Notophycus fimbriatus* (Solieriaceae), a new genus and species of marine Rhodophyceae from the Antarctic Peninsula,** *Phycologia,* Dec. 1986 25(4), p.544-550, 11 refs.

Notophycus fimbriatus n. gen. and n.sp. of marine Rhodophyceae is described from the Antarctic Peninsula and assigned to the Solieriaceae. Thalli consist of numerous, large, undivided blades borne on a branched, proliferous stipe. Blades are multiaxial, with a thick, filamentous medulla. Carpogonial branches, which are directed inwards, are composed of (2-)3(-4) cells. The trichogyne is reflexed and spirally coiled. Several connecting filaments are produced by each of the derivatives of the fertilized carpogonium. Cystocarps, which have a large central fusion cell and peripheral clusters of carposporangia, are entirely embedded in the blade. Tetrasporangia are unknown. *Notophycus fimbriatus* has been found only subtidally along the central west coast of the Antarctic Peninsula. (Auth.)

B-35063

Orcutt, D.M., Parker, B.C., Lusby, W.R., **Lipids in blue-green algal mats (modern stromatolites) from antarctic oasis lakes,** *Journal of phycology,* Dec. 1986 22(4), p.523-530, 32 refs.

Lipids comprising the stenols, stanols, polar lipid fatty acids, alkanes and alkenes of blue-green algal-(diatomaceous)-microbial mats and cores (modern cold water stromatolites) collected from three antarctic lakes were identified and compared with those of other algae. The presence of C28 stenols was suggestive of diatom input. C29 stenols may have originated from blue-green algae. However, the findings were atypical for known stenol components of several blue-green algal species previously reported. This strongly implicates diatoms as well as blue-green algae as important biogenetic sources of lipids and has established the potential for studies of lipid diagenesis in these unique cold, freshwater stromatolites. (Auth. mod.)

B-35070

Williams, R.C., Jr., Detrich, H.W., III, **Presumptive MAPs and "cold-stable" microtubules from antarctic marine poikilotherms,** *New York Academy of Sciences. Annals,* 1986 Vol.466, p.436-439, 6 refs.

DLC Q11.N5

The microtubules (MTs) of fish living in antarctic waters are stable at habitat (and body) temperatures in the range -1.8 C to +2 C, conditions under which mammalian MTs become dissociated. The cold stability of these MTs is largely a property of their tubulin (Tb), rather than one conferred by MAPs or other stabilizing factors. At a given temperature, the critical concentration of antarctic fish Tb is simply much smaller than that of mammalian Tbs under the same conditions. Although MAPs do not appear to be required for the assembly of cold-stable MTs *in vitro,* they may nonetheless be associated with MTs *in vivo.* The taxol-dependent protocol of Vallee was used to isolate microtubule proteins from brains of two antarctic cods *(N. coriiceps and N. gibberifrons)* and an ice fish *(Chinodraco hamatus).* MTs prepared from these fish contained Tb and a complement of presumptive MAPs. It is concluded that a major part of the cold stability of MTs of these organisms is due to adaptive properties of their Tbs. Novel MAPs are present, and they may contribute further to cold stability and to functional properties of the MTs.

B-35083

Nikolaev, V.A., **Morphology and taxonomy of antarctic benthic diatoms** [Morfologiia i taksonomiia diatomovykh vodorosleĭ bentosa Antarktiki], *Antarktika; doklady komissii,* 1984 No.23, p.133-141, In Russian. Refs. p.140-141.

DLC G576.A65

The morphology of 9 species (8 genera) of benthic diatoms Biddulphiineae, on the basis of scanning electron microscopy, is described. From the data obtained, and analysis of pertinent literature, some taxonomic revision of these species is carried out distributing them, geographically, into 3 groups: endemic, exotic and relict.

B-35084

Gruzov, E.N., **Traces of past glaciation in the vertical distribution of starfish** [Sledy proshlogo oledeneniia v vertikal'nom raspredelenii morskikh zvezd Antarktiki], *Antarktika; doklady komissii,* 1984 No.23, p.142-154, In Russian. Refs. p.153-154.

DLC G576.A65

Analysis of data from literature regarding the vertical distribution of starfish on the antarctic continental shelf shows that all specimens in East Antarctica are eurybathic. An anomaly of faunal vertical zonality on the antarctic shelf is noted, characterized by the absence of specific shallow-water fauna in East Antarctica and the scarcity of typical surface-sublittoral species in West Antarctica. The slope fauna, at 500-800 m depth, is similar to, if not identical with, the fauna of the shelf. These ecological features are linked to conditions existing during maximum glaciation, with the conclusion that the contemporary shelf fauna originated from the upper layers of the continental slope.

B-35088

Usher, M.B., Edwards, M., **Two new species of tydeid mite *(Acarina, Prostigmata)* from the maritime Antarctic,** *British Antarctic Survey. Bulletin,* Nov. 1986 No.73, p.1-7, 15 refs.

In a study of the mites of the family tydeidae in the maritime Antarctic, two genera, *Apotriophtydeus* and *Pretriophtydeus,* have widespread distributions. Amongst approximately 3600 tydeids identified, eight were not assignable to these two genera. Three specimens from Signy Island (South Orkney Islands) were identified as belonging to the genus *Paratriophtydeus,* four specimens from Signy Island and Rothera (Adelaide Island) belonged to the genus *Paratydaeolus,* and a single tritonymph from the Refuge Islands (Marguerite Bay) has not been assigned to a genus. Two new species are described: *Paratriophtydeus dubius* n.sp. and *Paratydaeolus enigmaticus* n.sp., the type locality of each being Signy Island. (Auth.)

B-35092

Buryn, R., Usher, M.B., **Morphometric study of the mite, *Oppia loxolineata,* in the maritime Antarctic,** *British Antarctic Survey. Bulletin,* Nov. 1986 No.73, p.47-50, 8 refs.

The aim of this study was to examine the morphological variation of *O. loxolineata* throughout its geographical range in the maritime Antarctic and to determine whether morphologically distinct populations occur. Observations were made on 43 adult *O. loxolineata,* collected during the austral summers of 1980/81 and 1981/82, from 16 localities along an 8 deg latitudinal transect. In addition, two of Wallwork's (1965) syntypes were examined and included in the analysis. For all 45 mites a total of 60 characters were scored. A principal coordinates analysis was used so that the results could be compared with those of analyses on other antarctic mite genera and species, notably *Gamasellus racovitzai* (Trouessart) with two subspecies (Jumeau and Usher, 1987), *Eupodes* (Booth and others, 1985) and *Tydeus s lat.* (Usher and Edwards, 1986). Results are presented and discussed.

B-35094

Usher, M.B., Booth, R.G., **Portable extractor for separating micro-arthropods from soil,** *Pedobiologia,* 1984 26(1), p.17-23, 11 refs.

DLC QL110.P4

A new design of high-gradient soil arthropod extractor is described. To make it portable, it was constructed largely of aluminum. As it was frequently necessary to use the extractor at sea, cold air from an airconditioning unit was used to cool the underside of samples, whilst a fan heater and lights were used to heat the samples' surfaces. In trial studies large numbers of juvenile arthropods, especially Prostigmata, were extracted. The extractor was used during 2 antarctic summer seasons, an antarctic winter, and a number of sea passages in the Antarctic.

B-35096

Parukhin, A.M., **Features of helminthofauna in commercial Nototheniid fishes from the subantarctic sector of the Indian Ocean** [Osobennosti gel'mintofauny promyslovykh nototenievykh ryb subantarkticheskogo sektora Indiĭskogo okeana], *Vestnik zoologii,* May-June 1986 No.3, p.6-9, In Russian. 9 refs.

Notothenia squamifrons, N. rossi rossi, N. larseni, N. magellanica and *Dissostichus eleginoides,* the endemics of the antarctic region, were studied in 1982. Five hundred and seventy-one fishes were subjected to a full helminthological section. Special attention was directed at helminths which were found in the muscles. These parasites are a source of medical and parasitological danger. Twenty-nine parasitic worm species, 1 leech species *(Cryobdella* sp.) and 1 parasitic crayfish species *(Eubrachiella gaini)* were found. (Auth.)

B-35097

Grishin, M.A., Zvegintsev, A.I., **Drying krill meat in the developed stage of the boiling layer** [Sushka miasa krilia v razvitoĭ stadii kipiashchego sloia], *Russia. Ministerstvo vysshego i srednego spetsial'nogo obrazovaniia. Izvestiia vysshikh uchebnykh zavedeniĭ. Pishchevaia tekhnologiia,* 1986 No.4, p.76-78, In Russian. 1 ref.

A mathematical model is presented for temperature measurement and determination of the method most effective for drying of krill meat for storage. Best results are obtained at +75 C.

B-35099

Franks, F., **Antifreeze activity of antarctic fish glycoprotein and a synthetic polymer,** *Nature,* Jan. 14, 1987 325(7000), p.146-147, 13 refs.

Antifreeze glycoproteins (AFGPs) and proteins isolated from the sera of some polar fish species and overwintering insects are able to depress the freezing temperature of the aqueous body fluids (and of water) by means of a non-colligative mechanism. The first measurements of homogeneous (spontaneous) ice nucleation rates in deeply undercooled (<233K) solutions of AFGP and polyvinyl pyrrolidone (PVP), a well-characterized polymer which finds use as a cryoprotectant, are reported in this article. Experiments on the inhibition of ice crystal growth were performed in solutions containing AFGP and PVP under standardized conditions, and it was found that the homogeneous nucleation and crystallization rates are sensitive to low concentrations of both substances, but AFGP is remarkably effective at inhibiting ice crystal growth. (Auth. mod.)

B-35104

Lightowlers, P.J., **Taxonomy and distribution of the subantarctic species of *Tortula*,** *Journal of bryology,* 1986 14(2), p.281-295, 32 refs.

The 9 *Tortula* species and 2 varieties known from the islands of the subantarctic botanical zone are distinguished in a key. New synonymy, taxonomic notes and illustrations are provided and the presently known distribution of the species is reported and discussed. (Auth.)

B-35105

Frisvoll, A.A., **Southern Hemisphere synonyms of *Racomitrium sudeticum* (Funck) Bruch et Schimp,** *Journal of bryology,* 1986 14(2), p.339-346, 16 refs.

Type material is studied for 6 names of Southern Hemisphere *Racomitria,* viz. *R. austro-georgicum* Par., *R. amoenum* (Broth.) Par.,

R. substenocladum Card., *R. Skottsbergii* Card. et Broth., *R. substenocladum* fo. **nigrescens* Card. et Broth., and *R. austro-georgicum* var. *kranckii* Roiv. They are placed as synonyms of *R. sudeticum* (Funck) Bruch et Schimp., which accordingly is bipolar. *R. austrosudeticum* Broth. in Herz. belongs to the genus *Grimmia.* (Auth.)

B-35107

Peck, L.S., Clarke, A., Holmes, L.J., **Size, shape and distribution of organic matter in the Recent antarctic brachiopod *Liothyrella uva*,** *Lethaia,* Jan. 1987 20(1), p.33-40, 15 refs.

The living terebratulid articulate brachiopod *Liothyrella uva* (Jackson 1912) was sampled from a shallow water population at Signy Island. Neither shell height nor shell breadth were directly proportional to length and as a result there was a change in shell shape with size (and hence age); this change was small but statistically significant. The proportion of the total organic matter found in the shell and internal (mantle) tissues also changed with size. In small (5-7 mm length) brachiopods 70-80% of the total organic matter was located within the shell; this fraction decreased with increasing size until above about 25 mm length the proportion of organic matter in the shell was constant at 30-45%. Variability in this measure was influenced by infection with endolithic red algae. Punctal density was independent of size with a mean value of 95.7/sq mm. (Auth. mod.)

B-35109

Harasewych, M.G., ***Tractolira germonae,* a new abyssal antarctic volute,** *Nautilus,* Jan. 30, 1987 101(1), p.3-8, 14 refs.

Tractolira germonae, a new species of volute, is described from abyssal depths along the Scotia Arc, and assigned to the previously monotypic genus *Tractolira* on the basis of shell and radular morphology. Anatomical characters of this new species support the inclusion of *Tractolira* in the subfamily Odontocymbiolinae, and suggest a close relationship between the subfamilies Odontocymbiolinae and Zidoninae. (Auth.)

B-35113

Willan, R.C., Bertsch, H., **Description of a new pleurobranch (Opisthobranchia: Notaspidae) from antarctic waters, with a review of notaspideans from southern polar seas,** *Veliger,* Jan. 2, 1987 29(3), p.292-302, Refs. p.301-302.

The first side-gilled sea slug from Antarctica, *Bathyberthella antarctica,* n.sp. is described. It is unusually large for a member of its group and distinguished externally by its remarkably large foot and dark gray, blotched markings. Anatomically it compares closely to the abyssal *B. zelandiae* Willan, the only other species of the previously monotypic genus. The chief differences relate to body size, proportions of the foot, shell, and reproductive system. *Bathyberthella antarctica* has secondarily lost its penial gland. Three other species of the Pleurobranchidae, all belonging to the genus *Berthella,* occur in subantarctic waters: *B. patagonica* (Orbigny), *B. platei* (Bergh), and *B. medietas* Burn. (Auth.)

B-35122

Smith, G.A., Nichols, P.D., White, D.C., **Fatty acid composition and microbial activity of benthic marine sediment from McMurdo Sound, Antarctica,** *FEMS microbiology ecology,* Oct. 1986 38(4), p.219-231, 52 refs.

Signature lipids from the phospholipid esterlinked fatty acids (PELFA) of cell membranes were used to describe benthic microbial communities of 4 antarctic sediments. Metabolic activities of the communities were determined by incorporation of [H-3]thymidine into bacterial DNA and sodium [C-14]acetate into membrane lipids. The West Sound site at New Harbor contained the lowest biomass, while Cape Evans on the East Sound contained the greatest. A marked difference was also noted between sites in their sediment microbial community structure. The East Sound sites at Cape Armitage and Cape Evans contained a greater abundance of diatom marker lipids, whilst both sides of the Sound contained approximately the same relative amounts of bacterial groups distinguished using PELFA. Activity of sediment microorganisms measured by radiolabel incorporation under ambient conditions followed the trends of the biomass measurements. (Auth. mod.)

B-35123

Rees, G.N., Janssen, P.H., Harfoot, C.G., **Unusual strain of *Desulfovibrio* sp. from an antarctic lake,** *Federation of European Microbiological Societies. FEMS microbiology letters,* Dec. 1986 37(3), p.363-366, 18 refs.

An unusual sulphate-reducing bacterium was isolated from Lake Fryxell. Designated strain FESu, it illustrates the difficulty in assigning some isolates of *Desulfovibrio* spp. to a described species. FESu was characterized by its relatively low mol% G+C (45%), its rod-shaped morphology, inability to grow on lactate, pyruvate, malate or choline in the absence of sulphate, and by its lack of desulfoviridin. (Auth.)

B-35124

Rivkin, R.B., Voytek, M.A., **Photoadaptations of photosynthesis and carbon metabolism by phytoplankton from McMurdo Sound, Antarctica. 1. Species-specific and community responses to reduced irradiances,** *Limnology and oceanography,* 1987 32(1), p.249-259, Refs. p.258-259.

Irradiance-dependent rates of photosynthesis and photosynthate labeling patterns were measured for phytoplankton in McMurdo Sound. Species-specific and traditional whole-water techniques were used to compare the physiological responses of algae collected in a high light environment at the ice edge and from a low light environment under the annual sea ice. There were differences among species within the same sample, for the same species isolated from high and low light environments, and when species-specific responses were compared with that of the natural assemblage. Low-light-adapted algae incorporated significantly less C-14 into proteins and more into low molecular weight compounds and lipids than the same species isolated from a high light environment. Under conditions where reduced rates of protein synthesis were coupled with high rates of carbon uptake, the measurement of photosynthesis may not accurately reflect the physiological condition of the phytoplankton. (Auth. mod.)

B-35125

Markhaseva, E.L., **Revision of the genus *Batheuchaeta* (Calanoida, Aetideidae)** [Reviziia roda *Batheuchaeta* (Calanoida, Aetideidae)], *Zoologicheskiĭ zhurnal,* 1986 65(6), p.837-850, In Russian with English summary. 5 refs.

In addition to the 5 species of *Batheuchaeta* known earlier, 3 new species from the Kurile-Kamchatka trench and from the antarctic part of the Indian Ocean *(B. tuberculata* sp. n., *B. antarctica* sp.n. and *B. pubescens* sp. n.), as well as males of *B. anomala* and *B. peculiaris* unknown earlier, are described. *Pseudochirella gurjanovae* Brodsky, 1955 is transferred into the genus *Batheuchaeta,* and *Batheuchaeta brodskyi* Markhaseva, 1981, is synonymized with it. A diagnosis of the genus for males and keys for identification of both sexes of all known species are given. New boundaries of the *B. lamellata* range are given on the basis of new findings of the species in the North Atlantic and in the antarctic part of the Indian Ocean. The preliminary data on vertical distribution of members of the deep-water genus *Batheuchaeta* are discussed. These data were obtained as a result of processing of 122 samples collected in 1953 and 1966 during the 14th

and 39th cruises of the research vessel *Vityaz* in the Kurile-Kamchatka trench. (Auth.)

B-35134

Hoberg, E.P., ***Eulimdana rauschorum* n.sp., a filarioid nematode (Lemdaninae) from *Larus dominicanus* in Antarctica, with comments on evolution and biogeography,** *Journal of parasitology,* Oct. 1986 72(5), p.755-761, 29 refs.

Eulimdana rauschorum n.sp. is described from southern black-backed gulls, *Larus dominicanus* Lichtenstein. The species is most similar to *Eulimdana lari* (Yamaguti, 1935) from Charadriiformes in the Holarctic. Males have spicules equal in length that are asymmetric in structure distally. There are 4-5 and 3-5 caudal papillae in rows to the right and left of the anus, and 2 small genital papillae at the posterolateral margin of the anus. Females have a variable number of prominent caudal papillae and large microfilariae (365 micron in length). The morphological similarities and host distribution of *E. rauschorum* and *E. lari* suggest they are sister taxa in which cladogenesis of the former accompanied the isolation and subsequent speciation of *Larus dominicanus* in the Southern Hemisphere. (Auth.)

B-35139

Grolle, R., Seppelt, R.D., ***Seppeltia,* a new leafy genus of Metzgeriales from Macquarie Island,** *Hattori Botanical Laboratory. Journal,* June 1986 No.60, p.275-282, 18 refs.

Seppeltia Grolle, a new leafy genus of Metzgeriales, is described, illustrated and discussed. It is provisionally placed in the Pallaviciniaceae. The single species, *S. succuba* Grolle, is known only from Macquarie I. The accuracy of records on Noteroclada from Australasia is questioned. (Auth. mod.)

B-35141

Usher, M.B., **Population and community dynamics in the soil ecosystem,** Ecological interactions in soil. Edited by A.H. Fitter, D. Atkinson, D.J. Read and M.B. Usher. Special publication No.4 of the British Ecological Society, Oxford, Blackwell Scientific Publications, 1985, p.243-265, Refs. p.261-265.

This literature review concentrates on studies on soil arthropods, predominantly mites and springtails—including antarctic mite *Gamasellus racovitzai*— and their predators, such as the spider *Notiomaso australis* on South Georgia, and the effects of the environment on their population dynamics. Competition between soil arthropods is considered; succession is generally related to an increase in both the number of species and the density of most groups of the soil fauna. However, management effects are linked directly to modification of the physical habitat and to change in the soil organic matter content. The potential for perturbation experiments, replicated and designed to investigate interactions, is discussed. (Auth. mod.)

B-35142

Booth, R.G., Usher, M.B., **Relationships between Collembola and their environment in a maritime antarctic moss-turf habitat,** Ecological interactions in soil. Edited by A.H. Fitter, D. Atkinson, D.J. Read and M.B. Usher. Special publication No.4 of the British Ecological Society, Oxford, Blackwell Scientific Publications, 1985, p.279-284, 12 refs.

Study on Signy I. shows that only 2 species of Collembola occur regularly in this habitat: the more numerous, *Cryptopygus antarcticus* Willem, which is a widespread and abundant antarctic species, and *Friesea woyciechowskii* Weiner, which is currently known only from the South Orkney and South Shetland Islands. The vertical distribution of these 2 species of Collembola is discussed and illustrated, as is the vertical distribution of 8 measures of the physical and chemical environment of a block of moss-turf collected on Jan. 23, 1981. The effect of the physical and chemical environmental factors on the distribution of *Cryptopygus* and *Friesea* was examined in 2 zones: the green moss zone, and the dead moss zone. A positive correlation is found between water content and counts of *Cryptopygus* in the former, but a negative correlation in the latter. The influence of the environment on the distribution of *Friesea* in the dead moss zone appeared to be slight. The causes of the strongly aggregated distributions of the 2 Collembola species are discussed.

B-35215

Ainley, D.G., O'Connor, E.F., Boekelheide, R.J., **Marine ecology of birds in the Ross Sea, Antarctica,** Ornithological monographs no.32, Washington, D.C., American Ornithologists' Union, 1984, 97p., Refs. p.88-91.
DLC QL695.2.A35 1984

Seabirds were censused from icebreakers on six cruises in the Ross Sea and the adjacent South Pacific sectors of the Antarctic Ocean south of 60 S between 1976 and 1980. Daylight was largely continuous. During early summer, 15 Dec. to 4 Jan., 598 half-hour transects were made; during late summer, 16 Jan. to 21 Feb., 264 transects were made. Bird density and biomass were calculated based on these census results. Oceanographic measurements such as sea surface temperature and salinity, the thermal structure of the upper 400 m of water, and water clarity were made at regular, frequent intervals; ice conditions were recorded for each transect. Seabirds were collected at 14 localities to determine diet. The most clearly defined bird community was associated with pack ice and adjacent open seas influenced strongly by the presence of the pack ice nearby. It was comprised of nine species and was dominated numerically by Antarctic Petrels (52%) and in biomass by Emperor and Adélie Penguins (82%). A second, less well defined community overlapping with the latter was also comprised of nine species and was associated with seas free of pack ice but with abundant icebergs. It was dominated by the Antarctic Petrel. The third community was comprised of 13 species having affinities with the Subantarctic. These birds generally occurred where seas were completely free of ice. It appeared that the Antarctic Convergence is not an avifaunal barrier to the extent previously believed. The presence or absence of ice in the sea influenced species' occurrences to a much greater degree. (Auth. mod.)

B-35225

Panouse, M., **Light penetration and primary productivity in the Indian Ocean** [Pénétration de la lumière et production primaire dans le secteur Indien de l'Océan Antarctique (Campagne Apsara II—Antiprod III, 1984)], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.104-121, 11 refs., In French with English summary.

The light penetration and primary production measurements, made during the Antiprod 3 cruise, give a good illustration of the oligotrophic and turbulent character of the upper layer of this area of the antarctic ocean, and corroborate results from previous cruises. The correlation between the mean extinction coefficient and the mean density of pigments is highly significant, with only slight influence of factors other than the pigments (chlorophyll *a* and pheophytin *a)* upon the attenuation of light. The zonal distribution of production integrated over the euphotic layer shows a structure south of the 60th parallel more complicated than in the north. (Auth.)

B-35226
Jacques, G., **Phytoplankton communities in the Indian Ocean at the end of summer** [Communautés phytoplanctoniques dans le secteur Antarctique de l'Océan Indien en fin d'été (Campagne Aspara II—Antiprod III, 1984)], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.122-142, 21 refs., In French with English summary.

The study of phytoplankton communities south of the Polar Front, using the Utermöhl's method, confirms the low summer densities of microplankton (mean concentration = 30,000 cells/l) and the dominance of diatoms. Compared with earlier programs in the same area, Antiprod 3 cruise presents several unique features. One is the absolute dominance of pennal diatoms, among which *Fragilariopsis cylindrus* is nearly as abundant as *F. kerguelensis,* the latter still being the most abundant species. Another peculiarity is that the nanoplankton represents an important component only around Heard and Kerguelen islands, mainly due to the Coccolithophorids. Finally, a certain heterogeneity appears in both geographical and vertical distributions. In particular, a second maximum of microphytoplankton is observed in addition to the usual found in the surface layer; this second peak occurs at the lower limit of the euphotic zone and is sometimes greater than the surface one. (Auth.)

B-35227
Bedo, A., Mayzaud, P., Corre, M.C., **Biochemistry of organic particulate matter in the Indian Ocean in 1984** [Caractéristiques biochimiques de la matière organique particulaire dans le secteur sud-Indien de l'Océan Antarctique (Campagne Apsara II—Antiprod III, 1984)], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.143-158, 16 refs., In French with English summary.

A survey of spectral and biochemical characteristics of natural particulate matter was made in the Indian Ocean. The krill's trophic environment was defined by protein, carbohydrate and lipid contents of particulate matter collected at nine standard depths of the 0-200 m layer. Except for protein, the horizontal distribution of integrated values of particule standing stock was relatively homogeneous. A great intra- and inter-station diversity in the vertical profiles and in the size spectra contrasts with this apparent uniformity, showing a strong variability in the composition (detrital and living fraction) and physiological state of the particulate matter. The SS/P and ST/P ratios are indicative of large variations in the proportions of structural vs. metabolic carbohydrates in the particles sampled and of their nutritive value. (Auth.)

B-35228
Descolas-Gros, C., Billy, G. de, Fontugne, M., **Phytoplankton carboxylase metabolism and C-13/C-12 ratio of organic carbon, 1984** [Métabolisme carboné du phytoplancton antarctique: activité de trois carboxylases et rapport isotopiques C-13/C-12 du carbone organique (Campagne Apsara II—Antiprod III, 1984)], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.159-163, 9 refs., In French with English summary.

Carboxylase activities (ribulose-1,5-bisphosphate carboxylase, phosphoenolpyruvate carboxylase, phosphoenolpyruvate carboxykinase) and C-13/C-12 ratio (expressed as delta C-13) were measured simultaneously at 13 stations and 6 depths. Results obtained on communities at the end of a bloom showed high phosphoenolpyruvate carboxykinase activities associated with low C-13/C-12 ratio values. This is interpreted as a means of adaptation to poor environmental conditions. (Auth.)

B-35229
Ribier, J., Godineau, J.C., Patillon, M., **Isolation, axenisation and culture of antarctic diatoms. Growth and physicochemical parameters (light, movement, silica rate)** [Isolement, axénisation et culture de Diatomées antarctiques. Croissance en fonction de paramètres physico-chimiques (lumière, agitation, taux de silice)], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.164-174, 6 refs., In French with English summary.

Twenty diatoms among 22 planktonic algae were isolated. The species determinated are: *Ac Actinocyclus actinochilus, Chaetoceros dichaeta, Cosinodiscus furcatus, Fragilariopsis (=Nitzschia) cylindrus, F. kerguelensis, Nitzschia lecointei,* and *Rhizosolenia alata forme inermis.* Most of the non-identified species belong to the *Nitzschia, Chaetoceros, Licmophara,* and *Navicula* genus. Axenisation was obtained with 12 species: these species are conserved on solid medium. A growth study under various culture conditions was conducted with 14 species. (Auth.)

B-35230
Stahl, J.C., **Preliminary data on seabird distribution in the southwestern Indian Ocean** [Distribution des oiseaux marins dans le sud-ouest de l'Océan Indien: données préliminaires de la Campagne Apsara II—Antiprod III], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.175-190, 20 refs., In French with English summary.

The seabird distribution between Reunion, Crozet and Amsterdam islands and Prydz Bay is presented according to the data of 1058 10-minute counts. Highest bird abundance and biomass is found on the shelves of Kerguelen and Heard islands, in the vicinity of the Subtropical Convergence and within the East Wind Drift. Species richness and diversity reach their maximum in the neritic and frontal zones of middle latitudes. Several species show strong longitudinal variations in their distribution. Spatial segregation between adults and immatures is observed in most albatrosses. (Auth. mod.)

B-35237
IAkush, E.V., Maksimova, O.N., **Changes in 5'-inosine monophosphate during sterilization of krill meat** [Izmenenie 5'-inozinmonofosfata v protsesse sterilizatsii miasa krilia], *Rybnoe khoziaĭstvo,* Dec. 1985 No.12, p.63-64, In Russian.

Changes of 5'-inosine monophosphate (5-IMP) were studied in canned krill during or after sterilization. Nucleotides were extracted with 0.6M HClO 4; analysis was in a high-pressure liquid chromatograph with a spectrum-monitoring detector. Traces of 5-IMP were present in unsterilized meat; there was a dramatic rise of 5-IMP during heating to sterilization temp., up to 10.94 mg/100 g. This was followed by a decrease during sterilization, and contributed greatly to waste and aroma formation in the finished product. Ribose was formed, as 5-IMP was further decreased, along with inosine, hypoxanthine, and uric acid.

B-35238
Takizawa, K., Sada, M., Okazaki, E., Suzuki, T., **Manufacture of crab meat-textured protein fiber from antarctic krill,** *Japanese Society of Scientific Fisheries. Bulletin,* July 1986 52(7), p.1243-1248, In Japanese with English summary. 15 refs.

Attemps were made to process *Euphausia superba* meat into crab meat-textured protein fibers. To frozen krill tail meat were added 4% NaCl and 1% NaHCO 3 and the mixture was homogenized in a vacuum food cutter to obtain a viscous paste. This paste was extruded from nozzles (1-2 mm diam.) into ethanol at 15 deg. C, and the fibers formed were kept immersed for 15 min. After washing with water, the fibers were steamed at 85 deg. C for 30 min. Fibers prepared from fresh tail meat showed physical parameters similar to kamaboko, whereas fibers from deep-frozen krill tail meat showed those resembling boiled crab meat. Physical properties of the fibers differed among the krill materials used, and also with the conditions of ethanol treatment (the lower the temp. and the higher the ethanol concentration, the higher the elongation ratio). Results suggest that crab meat-textured protein fibers may be processed from different krill materials by arranging the processing conditions. (Auth.)

B-35240

Robineau, D., **Adaptive significance of size and pigmentation of an isolated population of the subantarctic dolphin *Cephalorhynchus commersonii* (Lacépède, 1804)** [Valeur adaptative des caractères morphologiques distinctifs (taille et pigmentation) d'une population isolée d'un dauphin subantarctique, *Cephalorhynchus commersonii* (Lacépède, 1804)], *Mammalia,* 1986 50(3), p.357-368, In French with English summary. Refs. p.366-368.

A geographical isolate of Commerson's dolphin has been recognized around the Kerguelen Is. The bigger size of animals in this population seems (in accordance with Allen's rule) related with a colder water environment. The different pigmentation pattern noted may be connected with an easier intraspecific recognition of individuals in more transparent waters than those originally inhabited by the species. A subspecies status is proposed for this population. (Auth.)

B-35242

Pearse, J.S., Bosch, I., **Are the feeding larvae of the commonest antarctic asteroid really demersal,** *Bulletin of marine science,* Sep. 1986 39(2), p.477-484, Refs. p.482-484.

Although many high latitude marine invertebrates brood their young, some of the most abundant and conspicuous species broadcast-spawn and have feeding larvae. The asteroid *Odontaster validus* is a prime example of the latter type; it occurs at high densities in shallow water around the antarctic continent, and it broadcast-spawns. Larvae of *O. validus* were reared through metamorphosis; they pass through a typical brachiolaria stage and metamorphose after about 5.5 months. In cultures that were unstirred, the larvae usually swam near the bottom, but when stirred the larvae remained suspended in the water. A total of 14 larvae of *O. validus* were collected in plankton samples in McMurdo Sound, all taken near the surface; considering the large number of adults in the area that had spawned 1 to 5 months before the plankton collections were made, this is not a large number of larvae. However, no embryos or larvae of this species have been taken in plankton samples made near the bottom or in bottom sediment samples. Whether the larvae are usually demersal or planktonic, and how they survive such a long period in the plankton if they are planktonic, remains unresolved. (Auth.)

B-35264

Ramírez C., M.E., **Sistematic list of antarctic benthic algae deposited in the National Museum of Natural History, Santiago, Chile** [Lista sistemática de algas bentónicas depositadas en el Museo Nacional de Historia Natural de Santiago, Chile], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.57-65, 6 refs., In Spanish with English summary.

A systematic list of 46 species of benthic marine algae collected during the summer season 1984-1985 along the antarctic coast is presented. This collection was deposited at the Herbarium of the National Museum of Natural History, Santiago, Chile. Each species is accompanied by the name of the collecting site, some observations about its habitat and the Herbarium number. (Auth.)

B-35265

Roby, D.D., Sallaberry A., M., Brink, K.L., **Notes on petrels (Procellariiformes) breeding on Ardley Island, South Shetland Islands** [Nota sobre nidificación de petreles (Procellariiformes) en isla Ardley, Shetland del Sur], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.67-72, 15 refs., In Spanish.

Ardley I., a small island off the Fildes Peninsula, King George I., was searched for nesting procellariiform seabirds from Jan. 23 to Feb. 6, 1986. Seven nests were located of *Daption capense* 13 nests of *Macronectes giganteus* and 71 nests of *Oceanites oceanicus.* In addition, *Fregatta tropica* almost certainly breeds on the island and a possible nest site was located. An estimated 600 pairs of *O. oceanicus* nest on Ardley I., a major breeding colony. The variety of crevices occupied and the distribution of nests sites suggest that the breeding population of *O. oceanicus* may be limited by available snow-free nest sites. Numbers of breeding *D. capense* and *M. giganteus* are not limited by nest sites and appear more susceptible to human disturbance than *O. oceanicus,* particularly during the early phases of the breeding season. Three other species of procellariiformes *(Fulmarus glacialoides, Pagodroma nivea, Pachyptila desolata)* are known to nest either on the South Shetland Is. or adjacent areas of the Antarctic Peninsula, but apparently do not nest on Ardley I. (Auth.)

B-35266

Torres, D., Gajardo, M., Valencia, J., **Notes on *Bubulcus ibis* and *Eudyptes chrysolophus* from South Shetland Islands** [Notas sobre *Bubulcus ibis* y *Eudyptes chrysolophus* de las islas Shetland del Sur], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.73-79, 23 refs., In Spanish with English summary.

Two new records of *Bubulcus ibis* on Greenwich I., in 1984 and 1985 are reported. The first record of this egret on this island was reported in 1979. These observations tend to confirm the hypothesis of population increase in the region nearest to the South Shetland Is. New records of *Eudyptes chrysolophus* are added. A couple was sighted in 4 successive antarctic seasons at Cape Shirreff, Livingston I., and 3 birds were seen near King George I., two of these on Ardley I. None of these individuals showed reproductive behavior or attempted to nest. Some ecological factors that may favor the dispersion of these species in the maritime Antarctic are discussed. (Auth.)

B-35267

Pastene, L.A., **Notes on the 6th and 7th Antarctic Expedition of Population Assessments of Minke Whale, *Balaenoptera acutorostrata,* under the IWC/IDCR Programme** [Notas sobre las campañas antárticas sexta y séptima de estimación poblacional de ballena enana, *Balaenoptera acutorostrata,* bajo el programa CBI/DIIC], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.81-89, 15 refs., In Spanish with English summary.

The antarctic cruises of population estimation of minke whale *Balaenoptera acutorostrata,* carried out in the whaling management areas 6 and 4 during the austral summers of 1984 and 1985, are described. The cetological surveys were carried out by scientists of 8 countries, under the guidelines of the Scientific Committee of IWC and the participation of 4 vessels, supplied by the governments of Japan and the USSR. In this paper the methodologies used on board are described and some general results are given. The importance of

these surveys for the national maritime interest of Chile is discussed. (Auth. mod.)

B-35268

Clayton, M.N., Wiencke, C., **Techniques and equipment for culturing antarctic benthic marine algae, and for preparing specimens for electron microscopy,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.93-97, 6 refs.

Attempts are described to fix benthic marine algae in Antarctica in preparation for electron microscopy studies. The steps described involve the collection of specimens, culturing techniques, transport of cultures, survival and subsequent growth of algal cultures, preparation for light and electron microscopy, and equipment recommended for each of the steps.

B-35275

Mujica B., A., Asencio V., V., **Composition and relative abundance of antarctic zooplankton in Bransfield Strait (SIBEX-2, Chile)** [Composición y abundancia relativa del zooplancton antártico en el estrecho Bransfield (SIBEX-Fase II, Chile)], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.95-104, 15 refs., In Spanish with English summary.

Results of composition and relative abundance of zooplankton from the Bransfield Strait during the austral summer 1985 are given. In comparison with the previous season, an important zooplanktonic heterogeneity was found in the Nelson Strait area and at the entrance of the Gerlache Strait, with copepods, euphausiids and chaetognaths as the main groups. In the first area, copepod and euphausiid larvae were predominant; in the second, copepods and appendicularia. (Auth.)

B-35276

Asencio V., V., Mujica R., A., **Ichthyoplankton in Bransfield Strait, SIBEX-2, Chile** [Ictioplancton del estrecho Bransfield (SIBEX-Fase II, Chile)], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.105-110, 15 refs., In Spanish with English summary.

A quantitative and qualitative analysis of the ichthyoplankton of the Bransfield Strait collected during the austral summer of 1985 is made. Seven species were found, finding *Notothenia larseni* to be the most abundant. The highest concentrations were found at the northeastern entrance of the Gerlache Strait next to the southern shores of the South Shetland Islands. (Auth.)

B-35277

Acuña, E.S., **Lanternfishes (Family Myctophidae) collected in Bransfield Strait (SIBEX-2, Chile)** [Peces linterna (Familia Myctophidae) recolectados en el estrecho Bransfield (SIBEX-Fase II, Chile)], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.111-124, Refs. p.123-124., In Spanish with English summary.

Four species of lanternfishes (myctophids) were captured in the southern area of the Bransfield Strait, during the SIBEX-2 cruise (summer 1985): *Electrona antarctica, Gymnoscopelus (Gymnoscopelus) braueri, Gymnoscopelus (Gymnoscopelus) nicholsi* and *Protomyctophum (Protomyctophum) bolini.* The diet, morphology and morphometry of the otoliths and the length-wet weight relationship of these fishes is analyzed. Copepods, euphausiids, *Euphausia superba* larvae and ostracods are the most frequent and/or numerous components of the stomach contents of these four antarctic myctophids. An external morphological similarity between the otoliths of *E. antarctica, G. braueri* and *P. bolini* was observed. However, they can still be recognized as being from different species. (Auth.)

B-35278

Balbontín, F., Garretón, M., Neuling, J., **Nutrition and prey size in fish larvae in Bransfield Strait (SIBEX-2, Chile)** [Composición del alimento y tamaño de las presas en larvas de peces del estrecho Bransfield (SIBEX-Fase II, Chile)], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.125-144, Refs. p.143-144., In Spanish with English summary.

In Jan. 1985 fish larvae were collected with IKMT and Bongo nets in the Bransfield Strait. Eleven species of fishes grouped in six families were identified: Bathylagidae, Paralepididae, Myctophidae, Nototheniidae, Harpagiferidae and Channichthyidae, besides one unidentified species of Nototheniidae. Gut contents were determined in 170 out of 201 measured larvae, consisting mainly of krill eggs, copepod eggs, other invertebrate eggs, larval stages of euphausiids, copepodites, and larvae of other crustaceans. Cannibalism was detected in *Trematomus newnesi.* Regression lines were estimated for the relation between mouth width and standard length of the most numerous larvae, all of them highly significant. A significant positive correlation was not found between the increase of the larval length and the mean width or maximum width of the ingested preys. Feeding strategies of larvae of different lengths are discussed taking into consideration the size spectrum of the ingested food, as well as the trophic relationship with the stages of development of krill. (Auth. mod.)

B-35279

Moreno, C., Rueda, T., Asencio, G., **Trophic level of *Pleuragramma antarcticum* in the region of the Bransfield Strait, with quantitative comparison with other areas of the Antarctic** [Nicho trófico de *Pleuragramma antarcticum* en la región del estrecho Bransfield, con una comparación cuantitativa con otras áreas del Océano Antártico], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.145-169, 18 refs., In Spanish with English summary.

The stomach contents of *Pleuragramma antarcticum* Boulenger were studied in specimens collected in the Bransfield Strait. Previously published nutritional data were compared using a quantitative approach, to find the common elements in the diet of the silverfish in a wide variety of ecological conditions in the antarctic pelagic ecosystem. It is found that in the Bransfield area the predominant food item was eggs of crustaceans and the copepod *Metridia gerlachei.* This species of copepod has been present in all previously reported papers. It is proposed that the antarctic silverfish has exploited an holopelagic niche using the more abundant and predictable resource, namely copepods rather than krill. (Auth mod.)

B-35284

Filson, R.B., **Studies on Macquarie Island lichens 3: the genus Sphaerophorus,** *Muelleria,* May 1986 6(3/4), p.169-172, 5 refs.

Two species in the genus *Sphaerophorus, S. ramulifer* and *S. tener,* are described and illustrated and a key is provided, with notes on their chemical constituents and distribution maps. *S. tener* is a very common lichen on Macquarie I., growing in drier habitats along the featherbed flats and amongst the cushion plants on the plateau. It may be confused with *Cladia aggregata,* but can easily be distinguished from that species by the solid medulla and the lack of perforations through the cortex. (Auth. mod.)

B-35285

Filson, R.B., Archer, A.W., **Studies in Macquarie Island lichens 4: the genera *Cladia* and *Cladonia*,** *Muelleria,* May 1986 6(3/4), p.217-235, 12 refs.

The species of *Cladia* and *Cladonia* which occur on Macquarie I. are examined critically and a full description of each is provided. Previous records are discussed and synonymy is given. The chemistry of each species was examined and the results are presented together with a taxonomic key and distribution maps. *Cladonia subantarctica* Filson & Archer is described as new. (Auth.)

B-35286

Subramanian, A.N., **Gain and loss rates and biological half-life of PCBs and DDE in the bodies of Adélie penguins,** *Environmental pollution,* 1987 43(1), p.39-46, Refs. p.44-46.

The gain and loss rates and the biological half-life of polychlorinated biphenyls (PCBs) and p,p'-DDE in wild birds were calculated using the values on burdens of these compounds in the bodies of Adélie penguins in a previous report. The daily loss rate of PCBs (0-26%) was found to be higher than DDT compounds (0-12%) resulting in the longer biological half-life of the latter compounds (580 days) than PCB's (270 days). Hence, once DDT compounds are absorbed they are more persistent in the organisms due to their high lipophilicity and comparatively less metabolisable nature than PCBs. (Auth.)

B-35287

Cowling, A.J., **Culture methods and observations of *Corythion dubium* and *Euglypha rotunda* (Protozoa: Rhizopoda) isolated from maritime antarctic moss peats,** *Protistologica,* 1986 22(2), p.181-191, Refs. p.190-191.

Two small euglyphid testate rhizopod species *(Corythion dubium* and *Euglypha rotunda)* of maritime antarctic provenance were isolated and cultured monoxenically with an indigenous strain of *Pseudomonas fluorescens* as bacterial food. The initial experimental trials with various amoeba culture media, microbial food types and subculture methods are described, together with observations on test morphology, feeding and reproduction of cultured specimens and the presence of unusual aberrant forms of *C. dubium* in culture. (Auth.)

B-35289

Robertson, G., **Population size and breeding success of the Gentoo penguin, *Pygoscelis papua,* at Macquarie Island,** *Australian wildlife research,* 1986 13(4), p.583-587, 20 refs.

During November 1984 there were 4700 breeding pairs of Gentoo penguins in 53 colonies at Macquarie I. Seventy-four percent of pairs bred on the west coast of the island. Breeding success of colonies ranged from 0 to 1.52 chicks per pair, with breeding success of the total population averaging 0.98 chicks per pair. Breeding success increased with colony size. (Auth.)

B-35290

Kolakowski, E., **Changes of non-protein nitrogens fractions in antarctic krill *(Euphausia superba* Dana) during storage at 3 and 20C,** *Zeitschrift für Lebensmittel-Untersuchung und -Forschung,* Dec. 1986 183(6), p.421-425, 15 refs.

Quantitative changes in non-protein fractions (volatile bases, trimethylamine, free amino-acids, peptides and polypeptides) were followed in krill, harvested in Admiralty Bay (King George I.), during storage at 3 and 20 deg C, in an attempt to determine the respective contributions of autolysis (endogenous) and microbiological (exogenous) processes in the spoilage of krill treated as a potential raw food material. The deterioration can be divided into two stages, one with autolytic processes predominant, causing a rapid hydrolysis of proteins to non-protein fractions, and the other with microbiological processes prevalent, manifesting themselves in an exponential increase in total volatile bases (mainly trimethylamine) content, leading to a deterioration in odor and flavor. (Auth. mod.)

B-35291

Odening, K., Zipper, J., **Ultrastructure of *Sarcocystis hydrurgae* n.sp. (Apicomplexa: Sporozoea) from *Hydrurga leptonyx* (Carnivora: Phocidae)** [Zur Ultrastruktur von *Sarcocystis hydrurgae* n.sp. (Apicomplexa: Sporozoea) aus *Hydrurga leptonyx* (Carnivora: Phocidae)], *Archiv für Protistenkunde,* 1986 131(1/2), p.27-32, In German with English summary. 13 refs.

Sarcocystis hydrurgae n.sp. is described from the antarctic Leopard seal. The new species characterization is based on the ultrastructure of the cyst wall and on size and structure of the sarcocysts, as well as on size and shape of the cystozoites. Additionally, oocysts are included into the diagnosis, presumably belonging to this species and found close to the sarcocysts in the musculature. (Auth.)

B-35292

Adams, N.J., Brown, C.R., Nagy, K.A., **Energy expenditure of free-ranging wandering albatrosses *Diomedea exulans*,** *Physiological zoology,* Nov.-Dec. 1986 59(6), p.583-591, Refs. p.590-591.

Carbon dioxide (CO2) production and water influx rates of free-ranging, foraging, wandering albatrosses *(Diomedea exulans)* attending chicks were measured by means of doubly labeled water. CO2 production for 9 birds averaged 0.656 ml CO2/g/h. This is equivalent to an overall energy expenditure of 3,354 kJ/bird/day or 1.83 times measured basal metabolic rate (BMR). This is the lowest field metabolic rate recorded for free-ranging birds and is attributable to the relatively low cost of the soaring flight used by wandering albatrosses as opposed to flapping flight. Energy cost of flight was estimated to be 2.35 times measured BMR. Breeding male and female albatrosses, respectively, spend 77% and 85% of their overall time budget and 83% and 89% of their overall energy budget foraging at sea. Water influx rates for 14 birds averaged 174 ml/kg/day, of which 57% could be accounted for by water in the food required by the adults alone. The remaining 43% is probably due to the additional food fed to nestlings, along with possible consumption of seawater. (Auth. mod.)

B-35293

Roby, D.D., Ricklefs, R.E., **Energy expenditure in adult least auklets and diving petrels during the chick-rearing period,** *Physiological zoology,* Nov.-Dec. 1986 59(6), p.661-678, Refs. p.676-678.

Energy expenditure rates of 3 high-latitude seabirds: least auklet, common diving petrel, and South Georgia diving petrel were measured during the chick-rearing period to test the hypothesis that power requirements for reproduction in pursuit divers are high relative to other seabirds. Standard metabolic rates (SMR) were 1.5 to 1.9 times predictions of allometric equations relating SMR to body mass in nonpasserine birds. Mass-specific CO2 production and fractional water-turnover rates in free-ranging adults were similar in the 3 study species. The daily energy expenditure (DEE)/SMR ratio ranged from 3.1 to 4.2. Among values of DEE for breeding birds measured by the DWL method, those obtained in this study were relatively high. The low gross foraging efficiency and high DEEs of the auklet and diving petrels suggest that the high energetic cost of foraging and food delivery to the nest constrains brood size. (Auth. mod.)

B-35297

Ward, G.D., Davis, L.S., Sadleir, R.M.F.S., **Foraging movements of Adelie penguins at Cape Bird,** *New Zealand antarctic record,* 1986 7(2), p.14-18, 6 refs.

The first known attempt to determine the foraging range of nesting Adelie penguins is described and a pilot study on the development

of equipment and techniques is reported. The work was conducted in the northern rookery at Cape Bird, Ross Island, where an estimated 44,000 breeding pairs of Adelie penguins nest. Radio tracking was chosen as the only practical method of following the penguins when they were away from the nest. The birds were expected to travel tens of kilometers out to sea, so powerful transmitters and high gain directional antennae mounted well above sea level were necessary. Some tracking data are presented, but the results are incomplete, as all penguins went beyond the range of the equipment, and the technique of tracking from helicopters proved difficult.

B-35298

Mabin, M.C.G., **C-14 ages for "Heroic Era" penguin and seal remains from Cape Evans, McMurdo Sound,** *New Zealand antarctic record,* 1986 7(2), p.19-20, 2 refs.

Bone collagen from a seal and an Emperor penguin and flesh and feathers from the same penguin were collected and age dated by C-14 methods. Both animals are believed to have been killed between 1911 and 1917. 1916 was chosen as the most likely year because the Ross Sea Party of Shackleton's Transantarctic Expedition was active at Cape Evans then, killing many penguins and seals to keep themselves alive. C-14 measured dates ranged between 1105 and 1610, pointing up the errors likely to be encountered in measurements made on materials which derived C-14 from these waters known to be depleted in C-14.

B-35308

Romero J., P., **Antarctic marine living resources and the new Convention that protects them** [Los recursos vivos marinos de la Antártica y la nueva Convención que los protege], *Boletín Antártico Chileno,* July-Dec. 1986 6(2), p.2-13, In Spanish.

The article reviews the antarctic food chain in the light of its vulnerability due to excessive exploitation of some of its links, and the objectives, origin and organization of the CCAMLR which protects it. Brief description of the protected species includes some algae, krill, the cephalopods, some fish, seals and the cetaceans.

B-35312

Honda, K., Yamamoto, Y., Kato, H., Tatsukawa, R., **Heavy metal accumulations and their recent changes in southern minke whales *Balaenoptera acutorostrata*,** *Archives of environmental contamination and toxicology,* Mar. 1987 16(2), p.209-216, Refs. p.215-216.

The concentrations of heavy metals in the livers of southern minke whales were determined by atomic absorption spectrophotometry, and their accumulation levels and variations were compared to food habit, and biological parameters. The concentration levels and bioconcentration factors of metals were relatively high for Fe and Cd and low for Hg when compared to seals and small-toothed cetaceans from different waters. For most of the metals examined, the concentrations were log-normally distributed. The concentrations of Fe, Cd, and Hg were positively correlated with age, but a correlation was not observed for the other metals. While the hepatic Fe concentration linearly increased with age, the concentrations of Cd and Hg increased up to the age of about 20 years and thereafter decreased year by year. Such unusual age trends of Cd and Hg are considered to be due to recent changes of the amount of food intake by the minke whale, as a result of structural disturbances in the antarctic marine ecosystem due to commercial whaling. (Auth. mod.)

B-35315

Clarke, A., Holmes, L.J., **Notes on the biology and distribution of *Pasiphaea* species from the southern ocean,** *British Antarctic Survey. Bulletin,* Feb. 1987 No.74, p.17-30, 28 refs.

Phasiphaeid decapods taken in deep water hauls by the British Antarctic Survey between 1980 and 1983 are described. Samples came from South Georgia and the Scotia Sea at depths to 2500 m. *Pasiphaea scotiae* is probably synonymous with *P. longispina* and is a common and widespread species in the midwater of the southern ocean. *Pasiphaea rathbunae* was also taken near South Georgia. (Auth.)

B-35316

Smith, R.I.L., Poncet, S., ***Deschampsia antarctica* and *Colobanthus quitensis* in the Terra Firma Islands,** *British Antarctic Survey. Bulletin,* Feb. 1987 No.74, p.31-35, 6 refs.

The previously unsubstantiated record of the two native antarctic flowering plants on Alamode Island, Terra Firma Islands, has been confirmed. Both species occur abundantly and flower profusely on the relatively sheltered northern slopes of the north-east side of the island. This establishes the status of this island as the southernmost site (68 deg 43 min S) in the world where vascular plants have so far been recorded. (Auth.)

B-35317

Edwards, M., Usher, M.B., **Adult and juvenile stages of two predatory mites, *Rhagidia gerlachi* and *Tuberostoma leechi,* in the maritime Antarctic,** *British Antarctic Survey. Bulletin,* Feb. 1987 No.74, p.37-48, 15 refs.

Two species of rhagidiid mite are known from the maritime Antarctic. Although the adults of *Rhagidia gerlachei* and *Tuberostoma leechi* can be separated by morphological characters, their juvenile life stages have not previously been described. Multivariate statistical techniques are used to separate the two taxa of all life stages even when there are no apparent differences in chaetotaxy (e.g. the larvae). Discriminant function equations, based on measurements of three characters, enable larvae, protonymphs, and deutonymphs to be assigned to species. All of the juvenile stages of *R. gerlachei* are described, drawing attention to the differences between the corresponding stages of both species. The leg chaetotaxy is described in detail. Identification of all life stages of these two taxa has enabled a more detailed study of the species' distribution in the maritime Antarctic to be undertaken. *R gerlachei* has an extensive distribution along the Antarctic Peninsula and its offshore islands, whereas *T. leechi* is restricted to the South Shetland Islands and the northwestern fringe of the Antarctic Peninsula. (Auth.)

B-35320

Potts, M., **Variation in phospholipid ester-linked fatty acids and carotenoids of desiccated *Nostoc commune* (Cyanobacteria) from different geographic locations,** *Applied and environmental microbiology,* Jan. 1987 53(1), p.4-9, 25 refs.

Profiles of phospholipid fatty acids and carotenoids in desiccated *Nostoc commune* (cyanobacteria) collected from China, Federal Republic of Germany, and Antarctica and in axenic cultures of the desiccation-tolerant strains *N. commune* and *Hydrocoleum* were analyzed. The phospholipid fatty acid contents of the three samples of desiccated *Nostoc* species were all similar. A clear distinction can be made between the carotenoid contents of the axenic cultures and the desiccated field materials. In the former *beta*-carotene and echinenone predominate; in the latter, canthaxanthin and the *beta-gamma* series of carotenoids are found. (Auth. mod.)

B-35321

Yamane, Y., **Trace element content in two species of whale tapeworms, *Diphyllobothrium macroovatum* and *Diplogonoporus balaenopterae*,** *Zeitschrift für Parasitenkunde,* 1986 72(5), p.647-651, 10 refs.

Trace elements in two species of whale tapeworms, *Diphyllobothrium macroovatum* and *Dipologonoporus balaenopterae,* were analyzed by atomic absorption spectroscopy. One of the whales was caught in the Antarctic. Six elements (Fe, Cu, Zn, Mn, Cd, Ca) were assayed from different regions of two tapeworms: scolex, neck, immature, mature and gravid proglottids. Whole strobilae at different stages of maturity were also examined. The relationship between the trace element content and the physiological significance is discussed. (Auth.)

B-35324

Hui, C.A., **Porpoising of penguins: an energy-conserving behavior for respiratory ventilation?,** *Canadian journal of zoology,* Jan. 1987 65(1), p.209-211, 11 refs.

The leaps of porpoising captive Humboldt and blackfoot and free-ranging Adelie penguins were analyzed from film. Captive and free-ranging penguins leap with a mean emergence angle of 32 deg significantly different from the 45 deg angle assumed by some hydromechanical models. Captive bird leaps occurred over a maximum of 22% of the total distance travelled, making energy savings marginal. Although physically able to leap at 2.3 m/s, captive birds showed a minimum swimming speed to 3 m/s for the onset of leaping behavior, providing minimum in-air time comparable to the measured respiratory inhalation time. Porpoising may minimize energy expended for ventilation. (Auth.)

B-35325

Priscu, J.C., Priscu, L.R., Vincent, W.F., Howard-Williams, C., **Photosynthate distribution by microplankton in permanently ice-covered antarctic desert lakes,** *Limnology and oceanography,* Jan. 1987 32(1), p.260-270, 28 refs.

The distribution of C-14-labeled photosynthate by microplankton in Lakes Vanda and Fryxell was measured during the 1984-1985 austral summer. Both lakes had conspicuous deep chlorophyll maxima near the bottom of the oxygenated zone. DCMU sensitivity experiments revealed that photosynthesis below the chlorophyll maximum in Lake Fryxell was partially due to photosynthetic bacteria. These bacteria had notably higher protein and lower lipid labeling than overlying oxic microalgae. Protein labeling in the oxic microalgae had lower *Ik* and higher *a* values than for other photosynthetic end products, indicating that protein is synthesized more efficiently at low photosynthetic photon flux density than the other metabolites. The *Ik* values for complete photosynthesis are among the lowest yet recorded for phytoplankton. (Auth.)

B-35356

Garrison, D.L., Van Scoy, K., **Wilkes Land Expedition 1985: biological observations in the ice-edge zone,** *Antarctic journal of the United States,* 1985 20(5), p.123-124, 3 refs.

This study of features of the ice-edge zone along the Wilkes Land Coast was made as part of the Wilkes Land Expedition, 1985. Algal biomass in ice and water was estimated by measuring chlorophyll *a.* Samples from throughout the upper water column were collected using water-sampling bottles. In ice floes, samples were taken with an ice coring auger. Several samples of broken ice floes, surface slush, and brash ice were collected by bucket. Samples were preserved for chlorophyll *a,* pigmentation, nutrient, and microbial population studies. Results of analyses are presented.

B-35358

Parker, L.V., Sullivan, C.W., Forest, T.W., Ackley, S.F., **Ice nucleation activity of antarctic marine microorganisms,** *Antarctic journal of the United States,* MP 2217, 1985 20(5), p.126-128, 12 refs.

A brief review of recent research leads to the conclusion that scavenging is the mechanism by which microorganisms are incorporated in sea ice. Initial studies are presented of the relative ability of melted sea ice and pure cultures of ice algae and ice bacteria to nucleate water droplets. Details of this process are expounded.

B-35359

Kottmeier, S.T., **Ecology of sea-ice microbial communities during the 1984 winter-to-summer transition in McMurdo Sound, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.128-130, 12 refs.

Research during the 1984-1985 season began at winter fly-in (last week of August). A light-perturbation experiment was initiated to study the effect of extremes in downwelling irradiance on the growth and development of the sea-ice microbial community. The following questions addressed the ecology of that community during the seasonal transition from winter (low irradiance) to summer (high irradiance): what are the seasonal patterns of temperature gradients in sea ice under variable snow cover? How does the spectral composition and total downwelling irradiance change during this seasonal transition? How does the growth and metabolism of the sea-ice microbial community change during this seasonal transition? What is the effect of salinity on metabolism of the sea-ice microbial community? What are the dominant "cryopelagic" fauna (Golikov and Scarlato 1973) in McMurdo Sound and the trophodynamics of these organisms? A brief outline is given of measurement methods and of preliminary results developed from the study.

B-35360

White, D.C., Smith, G.A., Nichols, P.D., **Lipid composition and microbial activity of selected recent antarctic benthic marine sediments and organisms: a mechanism for monitoring and comparing microbial populations,** *Antarctic journal of the United States,* 1985 20(5), p.130-132, 6 refs.

Phospholipid ester-linked fatty acids were used to characterize and distinguish the microbial populations at 3 different sites in McMurdo Sound: Cape Armitage, Cape Evans, and New Harbor. Differences were apparent in microbial activity when comparing sediment samples collected in late Nov. and early Jan. which correspond to periods before and during the annual *Phaeocystis* diatom bloom respectively on the east side of McMurdo Sound. Hydrogen-3-thymidine incorporation into bacterial DNA showed only a slight increase during the sampling period. Carbon-14-acetate incorporation (8 hours) into total sediment lipid revealed a statistically significant ($p < 0.05$) increase in activity in the early Jan. samples. Novel long chain monounsaturated acids: 22:1, 24:1, and 26:1, were detected in the sea-ice diatom *Nitzschia cylindrus,* and these components could potentially be used as markers for this alga.

B-35361

Palmisano, A.C., **Photoadaptive strategies in a natural population of *Phaeocystis pouchetii* in McMurdo Sound,** *Antarctic journal of the United States,* 1985 20(5), p.133-134, 8 refs.

Colonies of the microalga *Phaeocystis pouchetii* (Hariot) Lagerheim were studied in McMurdo Sound, both in the water column and in association with sea ice. Prior to the *Phaeocystis* bloom, primary production is virtually restricted to sea-ice microalgae, with only low levels of chlorophyll *a* (less than 0.4 microgram per liter) found in the under-ice water column. With the onset of the *Phaeocystis* bloom in late Dec., *Phaeocystis* accounted for more than 99 percent of the phytoplankton in surface waters of east McMurdo Sound. To examine photoadaptive strategies in *Phaeocystis,* photosynthesis-irradiance [P(I)] relationships were determined using small-volume, short-term (1-hour) incubations at -1.8 C. It was found that *Phaeocystis* demonstrated a unique photoadaptive strategy in response to reduced irradiance beneath annual ice. A series of P(I) curves from samples collected on Dec. 24, 1984, revealed that the photosynthetic efficien-

cy increased by fourfold as the *Phaeocystis* adapted to the reduced irradiance. The maximum photosynthetic rate increased gradually from 3.5 to 7.3 mg carbon per mg chlorophyll *a* per hour.

B-35362
Heinbokel, J.F., Coats, D.W., **Ciliates and nanophytoplankton in Arthur Harbor, December 1984 and January 1985,** *Antarctic journal of the United States,* 1985 20(5), p.135-136, 6 refs.

Research during the 1984-1985 field season both confirmed findings from the 1983 cruise in the Weddell Sea, and supported suppositions concerning the numerical importance of the ciliate and nanophytoplankton assemblages. Five 24-hour stations were occupied in or near Arthur Harbor at approximately weekly intervals from Dec. 14, 1984 through Jan. 10, 1985. Samples were obtained at regular intervals from three depths: surface, 10 m, and 20 m. Preliminary results show that, as in the 1983 samples, there is no indication that tintinnine reproduction was phased over the diel cycle. Frequencies of dividing cells ranged approximately between 12 and 22% for *Cymatocylis* spp. and between 30 and 50% for the other 2 species of tintinnines studied. Division frequencies for all 3 species generally increased as the period of study progressed. Chlorophyll *a* concentrations greater than 6 micrograms per liter were never observed in the samples taken during this study. Total ciliate assemblage present in the vicinity of Palmer Station included Oligotrichs (including both tintinnine and non-loricated forms) which dominated all of the samples. The most abundant tintinnine was a small species of *Salpingella.* Relatively small (less than 50 micrometers) oligotrichines (genus *Strombidium* and/or closely related genera) generally exceeded the tintinnines in abundance.

B-35363
Garrison, D.L., Buck, K.R., **Microheterotrophs in the ice-edge zone: an AMERIEZ study,** *Antarctic journal of the United States,* 1985 20(5), p.136-137, 7 refs.

A summary of a study on microheterotrophs, such as heterotropic flagellates and ciliates, begun in the Weddell Sea in 1983 and continued during 1984 and 1985, is presented. The abundance of microheterotrophs in the upper water column for stations under heavy ice cover and along a transect across the ice-edge zone is shown. It is found that most of the microzooplankton biomass is concentrated in the upper 50 m; abundance drops markedly below approximately 50 to 60 m. Microheterotroph populations are much more concentrated in ice than in water but, because ice is limited to the upper 1 to 2 m, the largest fraction of microheterotrophs will still be found in the water column. Microheterotroph populations in ice are often dominated by heterotrophic flagellates, whereas those in water are almost entirely comprised of naked ciliates. Several forms that occur in both ice and water are also recognized. Population studies suggest that naked ciliates are abundant and probably ecologically important in food webs in the ice-edge regions.

B-35364
Pearse, J.S., Bosch, I., McClintock, J.B., **Contrasting modes of reproduction by common shallow-water antarctic invertebrates,** *Antarctic journal of the United States,* 1985 20(5), p.138-139, 9 refs.

Thirteen species of asteroids were collected and examined for reproduction in 1984-1985. Two of these species, *Diplasterias brucei* and *Notasterias armata* were known to brood embryos; approximately 10% of the population of *D. brucei* were brooding in 1984-1985, and several of these were followed in the field until they released their young (about 5 months). At least six other species are broadcast spawners and were seen to spawn gametes in the laboratory. Findings indicate that the predominant mode of reproduction among common shallow-water invertebrates in McMurdo Sound is pelagic lecithotrophy (about 60% of the asteroids) which, in turn, indicates that food conditions for larvae are limiting.

B-35365
Johnson, T.O., Smith, W.O., **Sinking rates of natural phytoplankton populations of the western Weddell Sea,** *Antarctic journal of the United States,* 1985 20(5), p.139-140, 6 refs.

The preliminary results of this study indicate that antarctic phytoplankton do not exhibit anomalous sinking rates, but that the rates are high enough to influence the vertical distribution of phytoplankton. Results of two experiments are shown in a table. The experiment at station 32 measured the sinking rates at the surface and at the pycnocline (65 m). All parameters indicated that the surface population sank faster than that from the pycnocline, although variations in the absolute rates calculated from different biomass indices ranged from 0.54 to 2.10 m/day. The experiment at station 17 tested the effect of light on sinking rates. Little difference was noted between a sample exposed to surface irradiance and one placed in darkness.

B-35366
El-Sayed, S.Z., Weber, L.H., **Size fractionation of antarctic phytoplankton,** *Antarctic journal of the United States,* 1985 20(5), p.141-143, 10 refs.

The relative contributions of the pico, nano and micro size fractions to the total phytoplankton biomass, as estimated by chlorophyll *a,* were determined during two cruises in the 1984-1985 summer around Elephant I. and off the coast of Enderby Land. In the former location, the relative contribution of the nanoplankton to total chlorophyll shows station-to-station variability; however, the nanoplankton contributes more than 85% to the surface chlorophyll and more than 70% to water-column mean values of chlorophyll. In the Indian Ocean area, in marked contrast to the samples obtained around Elephant I., the relative contribution of the nanoplankton increases with depth. Cells less than 20 micrometers contribute an average of 37% and 62% to the total chlorophyll concentration at the surface and 150 m, respectively. The picoplankton biomass is very low, contributing an average of only 14% (range 7 to 43%) to the total concentration of chlorophyll.

B-35367
Fryxell, G.A., Gould, R.W., Jr., Watkins, T.P., **Phytoplankton from the southwestern Atlantic Ocean,** *Antarctic journal of the United States,* 1985 20(5), p.143-145, 15 refs.

Dynamic changes of phytoplankton abundance under frontal conditions presented by the antarctic ice edge have been confirmed by quantitative data from preserved water samples, relative abundance measurements from net hauls, and experiments with living cultures. Materials were collected during two cruises in Nov. and Dec. 1983. Data show an ice-edge phytoplankton increase dominated by the prymnesiophyte, *Phaeocystis poucheti* (Hariot) Lagerheim, and the diatom, *Thalassiosira gravida* Cleve. Using samples taken under and in the ice, plus those from the open ocean, it is concluded that *T. gravida* was part of austral spring phytoplankton increase inoculated from the west or from the north and travelling south to the ice edge, while *Phaeocystis* was an important part of phytoplankton under the ice and showed a great increase *in situ* as the seasonal ice melted. Away from the ice edge, cell counts were even higher: in addition to *Phaeocystis,* the water column was dominated by *Thalassiosira gravida.* The abundance of the prymnesiophyte under and in the ice, as well as a possible sexual stage in the life cycle under the ice suggests that the seed stock of that part of the ice edge "bloom" came from the water column under the ice and from the ice itself. On the contrary, low numbers of *T. gravida* under the ice, as opposed to an average of more than 150,000 cells per liter in all samples taken north of the ice at cruise's end, suggest that this component was radiating principally from outside the ice.

B-35368
Rivkin, R.B., Voytek, M.A., Morris, I., **Photoadaptations of photosynthesis and carbon metabolism by antarctic phytoplankton: species-specific and community responses,** *Antarctic journal of the United States,* 1985 20(5), p.146-147, 8 refs.

Reported herein is a comparison between the photosynthesis-irradiance relationships for two of the more common phytoplankton, *Thalassiosira scotia* and *Fragilariopsis* sp. and that of the phytoplankton community. Plankton were synoptically collected at the ice edge and from under the annual ice approximately 16 km south of the ice edge. In this region the prevailing current flows south along the east side of McMurdo Sound. Phytoplankton would therefore be carried from the ice edge, where they would be exposed to relatively high irradiances, under the annual ice, where irradiances are low. This would thus represent ideal conditions to examine the *in situ* photoadaptations of photosynthesis and carbon metabolism and cell division. The photosynthesis vs. irradiance relationship for the phytoplankton assemblage is shown; the slope of the light-limited region of the photosynthesis vs. irradiance relationship was greater for the diatoms isolated from under the annual ice (i.e., low-light adapted) compared to the ice edge (i.e., high-light adapted). The results of this study serve to emphasize the differences in photoadaptations among species and between species-specific and community responses.

B-35369
DeLaca, T.E., **Trophic position of benthic rhizopods in McMurdo Sound,** *Antarctic journal of the United States,* 1985 20(5), p.147-149, 1 ref.

Detailed studies were conducted on the foraminifer *Astrammina rara,* a large (up to 11-mm maximum dimension), agglutinated species found in abundances of up to 1,800 individuals per sq m on both sides of McMurdo Sound. This species was found to consume all small particulates presented including 6 species of bacteria and 4 species of diatoms at typical environmental concentrations. It was also found to use free amino acids at concentrations available in the sediment and to kill and devour the larvae, juveniles, and adults of small metazoan species commonly co-occurring with this species. The list of metazoan prey taken by *A. rara* includes 11 species of crustaceans, 3 species of molluscs, and 4 species of echinoderms. Polychaetes and nematodes were also consumed. Some of the prey were up to 6 times larger than the foraminifera that captured them.

B-35370
Huntley, M.E., Sykes, P., Rohan, R., Marin, V., **Biomass, distribution, and trophodynamics of *Salpa thompsoni* in the Scotia Sea near the Antarctic Peninsula, austral summer 1983-1984,** *Antarctic journal of the United States,* 1985 20(5), p.149-150, 6 refs.

The salp, *Salpa thompsoni,* was a dominant component of the zooplankton of the Scotia Sea/Antarctic Peninsula region in the 1983-1984 field season. The biometry, biomass, distribution, feeding behavior, and trophic impact of this species, and euphausiid populations, on phytoplankton of the area were studied. From tabulated results, the following conclusions are drawn: in terms of wet weight biomass, salps were one order of magnitude more abundant than krill, but in terms of carbon biomass the reverse was true; the average salp and krill biomasses appear to consume no more than 10%, and perhaps as little as 1%, of the primary production; only the maximal krill biomass (i.e., the "superswarm" of 1981) might have been capable of cropping the average primary production; even the maximal salp biomass appears not to have been capable of this. Finally, comsumption by salps appears to be less than that by krill; preliminary data indicate that the biomasses of dispersed krill in the study region in 1981 and 1984 were approximately equal. It is concluded that in 1984 salps probably did not effectively compete with krill for food resources.

B-35371
Marin, V., Huntley, M., Holm-Hansen, O., **Observations at the Bransfield Strait/Bellingshausen Sea frontal zone in April 1985,** *Antarctic journal of the United States,* 1985 20(5), p.150-152, 4 refs.

The major objective of this 9-day sampling program, conducted on board *R/V Polar Duke* Apr. 6-15, 1985, in the Bransfield Strait and Bellingshausen Sea, was to study the small-scale variability of phytoplankton and zooplankton populations and their relationship to physical oceanographic features. Two stations (A and B) were sampled every 3 hours over a 24-hour period. Observations indicated high concentrations of chlorophyll at stations A and B. Krill were more abundant at station B than at station A. When station B was sampled again after an interval of 5 days, the day/night variability in zooplankton was much more pronounced. During the day, the community was dominated by *Themisto gaudichaudii,* but during the night it was dominated by *Euphausia superba.* The study of the front between Bellingshausen Sea water and Bransfield Strait waters revealed that the distribution of temperature at 150 m shows the presence of a convoluted frontal zone which has not been shown with this degree of resolution in the past. Chlorophyll data obtained during this survey suggest that the physical oceanographic conditions associated with this frontal zone may be important for enhanced biological production in Bransfield Strait.

B-35372
Wormuth, J.H., Berkowitz, S.P., **Vertical distribution and abundances of zooplankton in the vicinity of Elephant Island,** *Antarctic journal of the United States,* 1985 20(5), p.152-153, 3 refs.

During Feb. and Mar. 1984 a cruise was made covering the area from South Georgia to Elephant I. and the Bransfield Strait. The program was structured around large krill patches and included towed-net observations. Most of these tows sampled the upper 80 m with discrete samples collected every m vertically while the net was descending. Several tows were taken to depths of 350 m and one day/night pair was taken to 200 m with 25-m depth resolution. The data are considered in relation to data collected in the same area in Mar. 1981—a year in which krill, krill larvae, and copepods were in high abundances. In 1984, the samples were dominated by the salp, *Salpa thompsoni.* Copepods were in low abundance compared to 1981. While all copepod species are lumped together in this comparison, the species and their rank order of abundance were the same in the 2 years. The salps were sorted into five 2-cm size intervals. In comparing 1984 and 1981, the differences were less spectacular than for copepods but still quite pronounced. The "enrichment factor" (1984 divided by 1981) varied from 5 to 21 in the night samples and from 11 to 22 in the day samples. Ordination analyses of the combined data sets from 1981 and 1984 clearly show that 1984 was a "salp year."

B-35373
Ross, R.M., Quetin, L.B., Amsler, M.O., ***Euphausia superba:* a preliminary report on three areas of investigation,** *Antarctic journal of the United States,* 1985 20(5), p.153-155, 6 refs.

Field ingestion rates and fecal pellet sinking rates of adult krill, *Euphausia superba,* were determined on board ship in the waters near Palmer Peninsula during the austral summers of 1984 and 1985. In late Feb. field ingestion rates were over 5 micrograms chl *a* per animal/h. The mean fecal pellet sinking rate ranged from 100 to 525 m/d. Swimming behavior of the nauplii of krill was observed at 4 temperatures. The nauplii swam in a helical coil whose diameter increased as temperature decreased. In addition to brief bursts of swimming, the nauplii also sank through the water while "stroking," each stroke lifting the nauplii about 0.46 mm.

B-35374

Detrich, H.W., III, **Cold-stable microtubules from antarctic fish,** *Antarctic journal of the United States,* 1985 20(5), p.155-157, 10 refs.

Tubulin has been purified from the brains of two nototheniid species *(Notothenia gibberifrons, N. coriiceps neglecta)* and an ice fish *(Chaenocephalus aceratus).* The purified protein contained the *alpha-* and *beta-*tubulins and was free of microtubule-associated proteins (MAPs). The critical concentration for assembly of *N. gibberifrons* tubulin at 0 C was approximately 0.4 mg/ml. Thus, tubulin from antarctic fishes will assemble *in vitro* to yield microtubules at the habitat temperature of these cold-blooded organisms and at physiological protein concentrations. Because these purified preparations lack MAPs, the cold stability of microtubules from antarctic fish must result from adaptive changes in the tubulin subunits themselves. Although MAPs do not appear to be required for assembly of cold-stable microtubules *in vitro,* they may be associated with microtubules *in vivo.* Potential MAPs from 4 species of antarctic fish have been prepared by means of a taxol-dependent protocol. The characterization of these proteins is in progress.

B-35375

Radtke, R.L., Targett, T.E., Bell, J.L., **Growth resolution of antarctic fish,** *Antarctic journal of the United States,* 1985 20(5), p.157-159, 9 refs.

The microstructure was investigated in the otoliths of dominant antarctic fish, and daily increments were validated in *Notothenia gibberifrons, Trematomus newnesi,* and *Chaenocephalus aceratus* through the use of tetracycline to mark the otoliths. By examining the daily increments, the investigators have been able to distinguish growth stanzas and eliminate the ambiguity of growth determinations. The research has demonstrated that antarctic fish grow slowly and that daily increments in otoliths have the ability to record long-term activity in both adult and larval fishes. Scanning electron microscope (SEM) examinations of otolith internal structure has increased the resolution of daily increment enumeration and has made it possible to survey the core region of a fish's otolith and, thus, to determine growth history and to define events which have affected growth.

B-35376

Ahlgren, J.A., Kizer, N.L., DeVries, A.L., **Freezing avoidance and the distribution of antifreeze glycopeptides in antarctic fish,** *Antarctic journal of the United States,* 1985 20(5), p.160, 4 refs.

Experiments on the distribution of antifreeze glycopeptides in the fluids and body tissues of antarctic fish, which had been initiated during the previous season, were completed during 1984-1985 at McMurdo Station. These experiments involved administering radioactively labeled glycopeptide antifreeze into the blood of specimens of *T. bernacchii.* Results showed that the antifreeze glycopeptides appear to distribute throughout the body similarly to other blood macromolecules of equivalent size and shape. The epithelia of the fish was also assayed for radioactivity, and results showed that antifreeze glycopeptides from the blood are able to move into the extracellular spaces of the epithelia and into the mucus layer around the fish. A good correlation was established between the ability of the whole animal to avoid freezing and the ability of the skin to prevent ice propagation because freezing occurs in both cases in the same temperature range. A detailed study of the freezing avoidance in the gut of *T. bernacchii* was also undertaken. Results showed that the concentrations of ions were higher than in temperate-water ocean fish and lead to higher total osmolalities and greater freezing-point depression. The fluids are all hyposmotic to seawater. An estimate of their freezing point based on colligative properties indicates that they should have freezing points warmer than the freezing point of seawater (-1.9 C). These preliminary results provide evidence for some type of transcellular mechanism of transfer of low molecular-weight antifreeze glycopeptides from the blood to the bile.

B-35377

Hoberg, E.P., **Nearshore foodwebs and the distribution of acanthocephalan parasites in antarctic seabirds,** *Antarctic journal of the United States,* 1985 20(5), p.161-162, 19 refs.

Field studies, in the vicinity of Palmer Station during the austral summer of 1982-1983, yielded an extensive collection of acanthocephalans and other parasites from seabirds, fish and invertebrates. The continuing analysis of this material has resulted in the elucidation of factors that control the occurrence of *Corynosoma* spp. in antarctic seabirds. Notably, the host-distribution of *Corynosoma* spp. suggested that these parasites were being acquired from piscine or possibly amphipod prey, generally in nearshore habitats. The life cycles of *Corynosoma* spp., occurring in seabirds, are not generally completed in pelagic situations involving trophic relationships in which krill are significant prey for potential paratenic or final hosts. Although euphausiids have been implicated as dominant components of the antarctic marine ecosystem, they have not been found to be intermediate hosts for acanthocephala in the southern oceans.

B-35378

Parmelee, D.F., Parmelee, J.M., Fuller, M., **Ornithological investigations at Palmer Station: the first long-distance tracking of seabirds by satellites,** *Antarctic journal of the United States,* 1985 20(5), p.162-163, 3 refs.

From Dec. 8, 1984 to Jan. 3, 1985, birds were recorded that previously had been banded as chicks during the 1970s in the vicinity of Palmer Station. By means of an Arctic Survey Boat commissioned to go beyond the limits of the smaller boats (zodiacs) used near Palmer Station, these birds were searched for along the coasts of Anvers I. and adjacent smaller islands from Peltier Channel to Gerlache Point. The survey indicates in part that within the Palmer study area a fair number of young later return to their natal sites as breeding adults. Highlights of the survey include recovery of 22 southern giant petrels, 15 blue-eyed shags, 15 south polar skuas and one brown skua; discovery of a new Adélie colony near Gerlache Point; and the testing of 200-g, solar-powered radio transmitters that were attached to nesting giant petrels on Humble I. near Palmer Station, providing information about the response of the birds to the radios and to attachment methods.

B-35379

Eppley, Z.A., Harrison, N.M., **Distribution of marine birds off Wilkes Land, February 1985,** *Antarctic journal of the United States,* 1985 20(5), p.164-166, 3 refs.

Ornithological observations were conducted during the 1985 Wilkes Land expedition aboard the U.S. Coast Guard icebreaker *Polar Star* (Feb. 12 through Mar. 9), in a section of the southern oceans which has received little ornithological study. This region is not thought to support large krill populations, and seabird distribution uninfluenced by krill was of particular interest. In deep waters off the continental shelf, an average density of 15.95 birds/sq km was found. Snow petrels occurred in large numbers at the shelf edge, and when ice was present, Adélie penguins also occurred in large numbers. Bird density was low in shelf waters without pack ice; averaging 2.44 birds/sq km. Bird density in shelf waters was highest at the ice edge (23.30 birds/sq km). The ice edge avifauna was diverse and contained species typical of pack ice and other communities. Bird densities remained high in loose pack (1 to 60% ice cover), with an average density of 23.36 birds/sq km. Dense pack ice (70 to 100% ice cover) supported lower numbers of birds. The same species as in loose pack ice were present with the exception of antarctic fulmar.

B-35380

Hunt, G.L., Jr., Everson, I., Veit, R.R., Heinemann, D.W., **Distribution of marine birds and their prey in Bransfield Strait and southern Drake Passage,** *Antarctic journal of the United States,* 1985 20(5), p.166-168, 5 refs.

The distribution and abundance of marine birds and their principal food, krill were investigated in the Bransfield Strait and southern Drake Passage from Jan. to Mar. 1985. Continuous counts of marine birds and simultaneous continuous echo sounding surveys of krill were used to examine the correspondence between predators and their potential prey. Preliminary inspection of data suggests that, at a regional scale, marine bird densities were similar in all areas surveyed, but biomass was highest in the Weddell and the Bellingshausen Seas. Within the Bransfield Strait, bird densities were generally greater in the northern end and on the west side near the South Shetland Is. Krill densities were also higher in the northern end of the strait and in the channels between the islands. At a smaller scale (1 to 10 km), all major aggregations of birds encountered were associated with strong echoes suggesting high densities of krill. The converse was not true; on several occasions high densities of krill at depths appropriate for penguins to reach were found without accompanying birds. Detailed small-scale work over individual krill swarms provided data on the localization of bird foraging at the swarms. Apparent correlations between penguin presence and krill above 100-m depth was on a scale of tens to hundreds of meters.

B-35381

Trivelpiece, W.J., **Population studies of Adélie, gentoo, and chinstrap penguins,** *Antarctic journal of the United States,* 1985 20(5), p.168-169, 3 refs.

Banded, known-age populations of penguins on King George I. were studied from Oct. 12, 1984, through Feb. 13, 1985. Preliminary analyses of data revealed the following: 225 of 1,100 Adélie penguin chicks banded in 1981-1982 (3 year olds) returned to their natal rookery in 1984-1985; almost 30% of all gentoo chicks banded in 1983-1984 returned to their natal rookeries in 1984-1985 as 1 year olds, and 9% of the 2-year-old age cohort survived. Approximately 9% of the 2- and 3-year-old cohorts of chinstraps were sighted in their natal rookeries. All data are uncorrected for band losses and for losses of chicks between banding (3 to 4 weeks old) and fledging (7 to 10 weeks old); Adélies and chinstraps first attempted breeding at 3 years of age, and all breeders were females. However, while only 1 to 2% of Adélie 3-year-old females laid eggs, at least 40% of all returning 3-year-old chinstrap females bred. Breeding attempts were made by 55% of all 2-year-old gentoo penguins; including 9 females, 23 males, and 4 birds of unknown sex, out of a total of 66 2-year-old returnees.

B-35382

Zinsmeister, V.A.P., Valencia, J., **Ultrastructural histochemical demonstration of concanavalin A binding sites on Adélie penguin blood cells,** *Antarctic journal of the United States,* 1985 20(5), p.169-170, 2 refs.

The cellular and chemical composition of the hematopoietic system of wild pygoscelid penguins was analyzed by means of morphologic and histochemical techniques. Blood samples collected during Oct. and Nov. 1983 (Ardley I.) were stored in buffered 2.5% glutaraldehyde pH 7.4 at 4 C and have only recently been processed for cell-surface studies. The high-quality electron micrograph shown attests to the morphologic integrity of the intracellular organelles and the presence of concanavalin A binding sites on the cell surfaces. Long-term fixation has no deleterious effects on the cells in these studies.

B-35383

Jehl, J.R., Todd, F.S., **Census of the Adélie penguin colony on Paulet Island, Weddell Sea,** *Antarctic journal of the United States,* 1985 20(5), p.171-172, 5 refs.

In Nov. and Dec. 1984 a large colony of Adélie penguins *(Pygoscelis adeliae)* was censused on Paulet I. for the first time. Field estimates indicated that there were 54,200 nests in the colony. A similar figure (53,500) resulted from a study of the photographs. Because of foreshortening in the photographic field, it is considered that these estimates are conservative by about 10 to 15%. Two other aspects of the colony were notable. First, despite its size, there were virtually no predators in attendance. Only 1 or 2 pairs of snowy sheathbills *(Chionis alba)* were seen and the same number of brown skuas *(Catharacta skua lonnbergi),* and there was no evidence of egg predation. Second, unlike many colonies elsewhere on the Antarctic Peninsula, the one on Paulet was essentially continuous and not divided into discrete subcolonies. Furthermore, thousands of birds were nesting on very steep hillsides in habitats that are typically occupied by chinstrap penguins *(Pygoscelis antarctica).*

B-35384

Kooyman, G.L., Thorson, P.H., **Foraging characteristics of king penguins from Saint Andrews Bay, South Georgia,** *Antarctic journal of the United States,* 1985 20(5), p.172-173, 6 refs.

This study on King penguins was an extension of a preliminary project begun in Feb. 1980 at Schleiper Bay, South Georgia; the data, obtained at Saint Andrews Bay, South Georgia, during Feb. and Mar. 1985, are as follows: average weight gain for birds spending 7 days at sea was about 1.8 kg. Most of this gain was undigested food in the stomach. The food appears to consist mainly of fish. Dive depth records suggest that the fish are midwater species. Based on 11 dive records which were obtained from about 2 months at sea, it was found that the frequency distribution over nearly 7,400 dives seemed to be bimodal, with 27% of the dives deeper than 100 m.

B-35385

Bohne, B.A., Thomas, J.A., Yohe, E.R., Stone, S.H., **Examination of potential hearing damage in Weddell seals *(Leptonychotes weddelli)* in McMurdo Sound, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.174-176, 6 refs.

The objective of this study was to assess impacts of manmade noise in McMurdo Sound by examining the inner ears of Weddell seals for possible noise-induced loss of sensory cells. Results have worldwide application to the question of whether manmade noise adversely affects marine mammals. During the 1984-1985 austral summer, there were at least 80 dynamite explosions in McMurdo Sound (26 above water and 54 through sea ice), made by the U.S. Navy, the University of Alaska, and Scripps Institution of Oceanography. In Jan. 1985, 25 Weddell seals taken from the east and west sides of McMurdo Sound were sacrificed. A total of 18 cochleas were transported in Tyrode's solution to Washington University Medical School, St. Louis, Missouri, for analysis using techniques by Bohne (1972). The final dissection and analysis of the inner ears collected during this study will be undertaken in a separate study. Results will provide information on damage to the peripheral auditory system of Weddell seals.

B-35386

Bush, C.A., Feeney, R.E., **Conformation of the glycotripeptide repeating unit of antifreeze glycoprotein of polar fish as determined from the fully assigned proton n.m.r. spectrum,** *International journal of peptide and protein research,* 1986 Vol.28, p.386-397, 30 refs.

With its simple glycotripeptide repeating structure the antifreeze glycoprotein of polar fish may be an especially simple conformational mode for mucin glycoproteins with similar but more complex structures. Spectroscopically derived data have been combined with conformational energy calculations to give a conformational model for antifreeze glycoprotein in which the hydrophobic surfaces of the disaccharide side chains are wrapped closely against a three-fold left handed helical peptide backbone. The hydrophilic sides of the disac-

charides are aligned so that they may bind to the ice crystal face, which is perpendicular to the fast growth axis inhibiting normal crystal growth. (Auth. mod.)

B-35387

Feller, G., Péqueux, A., Hamoir, G., **Presence of carbonic anhydrase in 2 fishes from Kerguelen, *Channichthys rhinoceratus* free of hemoglobin and *Notothenia magellanica* of normal blood** [La présence d'anhydrase carbonique chez 2 poissons de l'archipel des Kerguelen, *Channichthys rhinoceratus* exempt d'hémoglobine et *Notothenia magellanica* de formule sanguine normale], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série III,* Oct. 26, 1981 293(7), p.395-397, In French with English summary. 5 refs.

DLC Q2.A26

An antarctic hemoglobin-free fish, living in the Kerguelen Archipelago, *Channichthys rhinoceratus,* is devoid of carbonic anhydrase in the blood but has a high content of this enzyme in the gills which appears to be twice that of another normal species living in the same area, *Notothenia magellanica.* This enzyme appears to play an important role in the osmoregulation of the Channichthyidae. (Auth.)

B-35407

Le Cohu, R., Maillard, R., **Freshwater diatoms from Kerguelen Islands, excluding Monoraphideae** [Diatomées d'eau douce des îles Kerguelen (à l'exclusion des Monoraphidées)], *Annales de limnologie,* 1986 22(2), p.99-118, In French with English summary. 38 refs.

The taxonomy of freshwater diatoms from the Kerguelen Is. was investigated. Samples were collected from 31 stations representing diverse habitats: brooks, rivers, lakes, wet rocks. 279 taxa are listed in this paper, of which 3 are described for the first time. Most species and varieties encountered have a wide geographical distribution; endemism is limited. Many species are represented by only a few individuals. The Centrales are poorly represented. (Auth.)

B-35408

Molinski, T.F., Faulkner, D.J., **Metabolites of the antarctic sponge *Dendrilla membranosa*,** *Journal of organic chemistry,* Jan. 23, 1987 52(2), p.296-298, 7 refs.

This is a follow-up of studies of the benthic community at McMurdo Sound which revealed that the sponge *Dendrilla membranosa* was extremely slow growing and was never observed to be eaten. It was concluded that *D. membranosa,* which has neither apparent spicules nor mucus, was chemically defended. This paper reports the isolation and identification of 9,11-dihydrogracilin A and membranolide, two metabolites related to the spongian group of diterpenes, that are likely candidates to be defensive constituents of *D. membranosa.*

B-35409

Siegel-Causey, D., **Courtship behavior and mixed-species pairing of King and Imperial Blue-eyed shags *(Phalacrocorax albiventer* and *P. atriceps)*,** *Wilson bulletin,* Dec. 1986 98(4), p.571-580, 21 refs.

The courtship behavior of King and Imperial Blue-eyed shags *(Phalacrocorax albiventer* and *P. atriceps)* was compared for similarity, and their potential was assessed as a behavioral isolating mechanism between the two species. No differences could be detected in form or sequence of behavioral patterns, although there were some minor distinctions between forms. Observations were made near the end of the breeding season and may represent only the postbreeding behavior. Several new displays for King and Imperial shags are described and contrasted with those known for the closely-related antarctic Blue-eyed shags *(P. atriceps bransfieldensis).* The courtship behavior of mixed-species pairs was nearly identical to conspecific pairs, and was difficult to distinguish. There were differences, however, in courtship and pairbonding behavior of King and Imperial Blue-eyed shags when compared with antarctic Blue-eyed shag. (Auth. mod.)

B-35410

Gerasimchuk, V.V., **Characteristics of antarctic silverfish, *Pleuragramma antarctica* (Nototheniidae), from Olaf-Pruds Bay (Commonwealth Sea, eastern Antarctica) with notes on the identification of the species,** *Journal of ichthyology,* 1986 26(5), p.10-17, 18 refs., Translated from Voprosy ikhtiologii.

One hundred and eight *Pleuragramma antarctica* females and 86 males were subjected to a morphometric analysis. The diagnosis of the genus and the species was supplemented with data on the presence of phyloric appendages. Reliable differences were found in males and females with respect to the length of the abdominal fins. Changes in the proportions of fishes were revealed when individuals were fixed in 10% formaldehyde. (Auth. mod.)

B-35411

Tankevich, P.V., **Morphometric characteristics of the Kerguelen marbled notothenia, *Notothenia rossi rossi,* from the Indian sector of the antarctic ocean,** *Journal of ichthyology,* 1986 26(5), p.125-129, 6 refs., Translated from Voprosy ikhtiologii.

The Kerguelen marbled notothenia, *Notothenia rossi rossi,* inhabiting the region of the islands of Kerguelen-MacQuarie, was first recognized as subspecies by Nybelin (1947) and later by Olsen (1964). In the works of these authors, meristic characters are cited primarily. For a clarification of differences between populations of the Kerguelen marbled notothenia, the author presents comparative morphometric analyses of the notothenia from the shelf of Kerguelen Is. and the "Lena" Bank. (Auth. mod.)

B-35412

Evseenko, S.A., Efremenko, V.N., **Larvae of the spotted mancopsetta, *Mancopsetta maculata* (Bothidae), from the southwestern Atlantic,** *Journal of ichthyology,* 1986 26(5), p.151-155, 6 refs., Translated from Voprosy ikhtiologii.

The spotted mancopsetta is one of the species of left-handed flounder which lacks pectoral fins in the adult stage. It is found in the southwestern Atlantic Ocean and southern Indian Ocean. Two subspecies were recognized, *M. maculata maculata* from the Falkland-Patagonia region and *M. maculata antarctica* from the region of the Shag Rocks and South Georgia Island; these differ in the shape of the gill rakers and in some meristic characters. In Dec. 1972 a flounder larva, ascribed to *M. maculata,* was captured in the southwestern Atlantic. The specimen is described in detail and, compared to 5 species of left-handed flounder from the Falkland region, found sufficiently different to necessitate a revised placement of the genus *Mancopsetta* in the classification of Norman's family Bothidae. (Auth. mod.)

B-35413

Bisaillon, A., Martineau, D., St.-Pierre, M.A., **Anatomy of the heart of beluga whale *(Delphinapterus leucas)*,** *Journal of morphology,* Jan. 1987 191(1), p.89-100, 26 refs.

The heart of the beluga whale *(Delphinapterus leucas)* is described from the dissection of seven specimens. As in most whales the heart is characterized by a transverse broadness and a flatness of the ventricles from one surface to the other and by an apex formed

by both ventricles. Heart size parameters are used for comparison with parameters of other marine and land mammals, including the Weddell seal and the minke whale.

B-35416

Pugh, G.J.F., Jones, E.B.G., **Antarctic marine fungi: a preliminary account,** Biology of marine fungi. Edited by S.T. Moss, Cambridge, Cambridge University Press, 1986, p.323-330, 22 refs.

This is a preliminary account of the fungi which have been recorded on wood blocks immersed in the sea at Factory Cove, Signy I., and at Grytviken, South Georgia. At Signy I., *Monodictys pelagica* was found on 98% of the balsa blocks, and *Ceriosporopsis tubulifera* on 46%. A sterile mycelium was present on most deal blocks and on all Ramin blocks; *M. pelagica* was found on more than half of the Ramin blocks. At Grytviken, from a total of 39 blocks examined 99 fungi were recovered, representing 9 identified and 4 unidentified species. The larger number of fungi present at Grytviken than at Signy suggest 3 possible factors: the sea temperature; the quantity and time scale of wood present in the sea; and the circumpolar winds and currents.

B-35417

Ribeiro, C., **Brazil studies antarctic fauna** [O Brasil estuda a fauna antártica], *Revista geográfica universal,* Nov. 1986 No.144, p.36-43, In Portuguese.

The article announces the event of the 5th Brazilian antarctic expedition to take place over the 1986-1987 summer season. The research plans center around the meteorological, oceanographic and geological evidence of a link between South America and Antarctica. Another important area of research will include the marking of antarctic birds, 40% of which migrate to Brazil during the winter. Photographs of birds, especially penguins, and seals, and a brief review of their taxa and environment, are presented.

B-35419

Roby, D.D., **Diet and reproduction in high latitude, plankton-feeding seabirds,** Philadelphia, University of Pennsylvania, 1986, 241p., University Microfilms order No.86-14859, Ph.D. thesis. Refs. p.225-241.

To determine how energy availability might influence reproduction, the relationship between feeding rates, food quality, parental care, and chick development were investigated in arctic and antarctic species of plankton-feeding seabirds: Least Auklet *(Aethia pusilla)* and two diving petrels *(Pelecanoides georgicus* and *P. urinatrix).* Using the doubly labeled water method, CO2 production rates were measured in free-ranging adults feeding nestlings. Energy expenditure rates were high relative to birds in general and seabirds in particular. High energy expenditure rates and low rates of energy delivery to the single-chick brood are consistent with a low gross foraging efficiency. Chick diets contained between 22 and 45% lipid and between 5 and 39% wax esters, a class of lipids previously thought resistant to digestion. Chicks rapidly and efficiently assimilated labeled wax esters and deposited the label as triacylglycerols in storage fat depots. Between 12 and 63% of chick energy requirements were supplied by wax esters, indicating waxes are an important energy source for reproduction. Between 52 and 64% of the energy accumulated by chicks was in fat deposits. Variation in fat accumulation rate was related to diet quality, specifically lipid content. Length of the brooding and nestling periods were inversely related to dietary lipid content. Protein intake was in excess of dietary requirements and growth was apparently adjusted to energy intake. Differences in diet quality and feeding rate were sufficient to explain much of the variation in chick development among the study species. Similarities in the reproductive energetics of diving petrels and auklets is strong evidence for the importance of ecological factors in shaping the breeding patterns of seabirds. (Auth. mod.)

B-35423

Weber, L.H., **Spatial variability of phytoplankton in relation to the distributional patterns of krill *(Euphausia superba)*,** College Station, Texas A and M University, 1984, 188p., University Microfilms order No.85-04724, Ph.D. thesis. Refs. p.93-106.

The role of krill *(Euphausia superba)* in influencing the spatial variability of phytoplankton is examined. Krill density and swarm characteristics (number, size, and biomass) were estimated acoustically. Data on phytoplankton biomass, productivity and species composition, together with data on the physico-chemical environment were obtained from discrete water samples collected from either 7 or 8 depths between 0-100 m at a total of 37 stations. Phytoplankton biomass is inversely correlated with mean krill density but positively correlated with the biomass of individual swarms. A positive correlation between krill density and the relative amounts of phaeopigments in the >20 m size fraction of phytoplankton suggests that krill selectively feed on larger cells. Over the range of 4-20 km, the variability in phytoplankton biomass is largely determined by physical processes; however, the steepness of the fluorescence variance spectrum relative to the temperature spectrum, together with consistent coherence between the phytoplankton and krill profiles, suggests that predator-prey interactions are of importance in determining the distributional patterns of the phytoplankton. (Auth. mod.)

B-35424

Mikell, A.T., Jr., **Physiological adaptations of microorganisms to high oxygen in two oligotrophic lakes,** Blacksburg, Virginia Polytechnic Institute and State University, 1984, 101p., University Microfilms order No.85-11946, Ph.D. thesis. Refs. p.8-15; 26-28; 48-52; 81-86.

This research addresses the community response of Lake Hoare to high oxygen. Lake Hoare was chosen specifically because of a relative lack of salinity, which would have affected the oxygen concentration, and the extensive record of dissolved oxygen seasonal data. Lake Hoare isolates adapted to the high oxygen were selected and factors which might explain their survival were studied. Isolates were obtained from the depth of maximum oxygen concentration. It is found that the physiological factors which potentially related to high oxygen survival and/or growth were the effect of nutrient concentration; the measurable catalase activity, the superoxide dismutase specific activity and type, and the carotenoid type and comparative growth of a carotenoid negative mutant and parent strain. The physiological factors are reviewed in some detail.

B-35425

Lair, N., Amanieu, M., Lam Hoai, T., Lasserre, G., **Use of abundance distribution models in the study of zooplankton communities. 2. Structure of a subantarctic lake community** [Application des modèles de distribution d'abondance aux communautés zooplanctoniques. 2. Structure du peuplement d'un lac subantarctique], *Vie et milieu,* June 1985 35(2), p.69-78, In French with English summary. Refs. p.78.

Analysis of the zooplankton community of Lake Studer (Kerguelen Is.), with biomass as basis of the functional units, shows that it is well balanced. Its organization is evaluated by comparison between theoretical distribution of Motomura, Preston, Mac Arthur and Mandelbrot's models and observed data. Variations in egg-laying periods correlated with data fitting Motomura's model, and periods where ecological space is filled and the species are distributed according to Mac Arthur's model, shows existence of competition between functional units. This annual cycle makes the community stable. (Auth. mod.)

B-35427
Mikell, A.T., Jr., Parker, B.C., Gregory, E.M., **Factors affecting high-oxygen survival of heterotrophic microorganisms from an antarctic lake,** *Applied and environmental microbiology,* Dec. 1986 52(6), p.1236-1241, 31 refs.

Factors relating to the survival of heterotrophic microorganisms were determined from the high-dissolved-oxygen (HDO) waters of Lake Hoare. This lake contains perpetual HDO about three times that of normal saturation (40 to 50 mg/l). Five isolates, one yeast and four bacteria, were selected. One bacterial isolate was obtained from the microbial mat beneath the HDO waters. This organism was isolated at normal atmospheric oxygen saturation. The bacteria were gram-negative rods, motile, oxidase positive, catalase positive, and superoxide dismutase positive; they contained carotenoids. Under low-nutrient levels simulating Lake Hoare waters (10 mg/l), two of the planktonic isolates tested were not inhibited by HDO. Growth inhibition by HDO increased as nutrient concentration was increased. A carotenoid-negative mutant of one isolate demonstrated a decreased growth rate, maximal cell density, and increased cell lysis in the death phase under HDO compared with the parent strain. The specific activity of superoxide dismutase was increased by HDO in four of the five bacterial isolates. The bacterial isolates from Lake Hoare possess several adaptations which may aid their survival in the HDO waters, as well as protection due to the oligotrophic nature of the lake. (Auth. mod.)

B-35428
Övstedal, D.O., **Lichens and lichen parasites from the British-Swedish-Norvegian Antarctic Expedition 1949-52 to Dronning Maud Land,** *Cryptogamie, bryologie, lichénologie,* 1986 7(1), p.63-70, 15 refs.

Twenty-three species of lichens, plus 4-5 taxa of uncertain identity, were recorded in western Queen Maud Land. Some taxonomic remarks are given. *Bacidia trachona* (Ach.) Lettau and *Caloplaca jungermanniae* (Vahl) Th. Fr. are reported for the first time from the Antarctic. *"Lecidea" oroantarctica* is described as new. Phytogeographical relations are discussed.

B-35429
Vergani, D.F., Stanganelli, Z.B., **New methods for population studies in southern elephant seals *Mirounga leonina*** [Nuevos métodos para el relevamiento de información en el estudio de las poblaciones de Elefantes Marinos del Sur, *Mirounga leonina*], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1986 No.318, 19p., In Spanish with English and German summaries. 6 refs.

The processing of data, obtained in studies of elephant seals at Valdés Peninsula and 25 de Mayo Island, is discussed. Methods were developed for the implementation of a system of data processing which is both quick and efficient. They concern: a census methodology, for qualitative and quantitative population evaluations; and length measurements, to determine the structure of population lengths through the use of a theodolite and trigonometric relationships. To process all the information obtained, 3 programs in FORTRAN IV language were worked out and are presented here.

B-35432
Hecht, T., Cooper, J., **Length/mass relationships, energetic content and the otoliths of antarctic cod *Paranotothenia magellanica* (Nototheniidae: Pisces) at subantarctic Marion Island,** *South African journal of zoology,* Oct. 1986 21(4), p.294-296, 9 refs.

Relationships between otolith length and fish length, wet and dry mass and total energy are described for antarctic cod *Paranotothenia magellanica* from Marion I. The relationships were all highly significant and allow for more detailed and quantitative studies of the trophic structure of the area. (Auth.)

B-35434
Maderek, R., **Quality of meat and meat products from hogs fed a whole diet with added krill meal** [Jakość miesa i wyrobow miesnych z tuczników żywionych mieszanka pelnoporcjowa z dodatkiem maczki z krylaj, *Instytut Przemyslu Miesnogo i Tluszczowego. Roczniki,* 1983/1984 Vol.20-21, p.63-73, In Polish with English and Russian summaries. 25 refs.

DLC TS 1950.W3

Influence of krill meal, used as a substitute for fish meal in fattening hogs, on quality of meat, backfat and canned ham was studied. Krill meal added at 3.7 and 2.5%, in the 1st and 2nd fattening period, respectively, did not influence PSE and DFD incidence. No significant change in chemical composition of the meat was observed. (Auth. mod.)

B-35443
McGrath Grossi, S., Kottmeier, S.T., Moe, R.L., Taylor, G.T., Sullivan, C.W., **Sea ice microbial communities. 6. Growth and primary production in bottom ice under graded snow cover,** *Marine ecology progress series,* Jan. 27, 1987 35(1-2), p.153-164, Refs. p.163-164.

The effect of under-ice irradiance on *in situ* growth and production of sea ice microalgae was investigated at McMurdo Sound in 1982. Five 100 sq m quadrats on annual ice were delimited in early Oct. with 0.5, 10, 25 and 100 cm snow cover; under-ice irradiances ranged from <0.02 to 100 micro-E/sq m/s. Standing crop, growth rate and photosynthetic rate were greatest in snow-free ice (Q-0) where chlorophyll *a* concentration increased from 0.1 to 76 mg/sq m in the platelet layer and from 0.05 to 9 mg/sq m in bottom congelation ice over 5 wk. Blooms occurred later in quadrats with 5, 10, and 25 cm cover; however, growth rates were less than half that in Q-0. The hypothesis that microalgal standing crop in bottom ice approximates cumulative production was tested. Peak algal standing crop at Q-0 was estimated to be 3.2 g C/sq m, based on a carbon to chlorophyll ratio of 38. However, net primary production based on *in situ* measurements of photosynthetic rate was 10-fold higher, at 41 g C/sq m. This finding suggests that previous estimates of sea ice production must be revised sharply upward. (Auth.)

B-35444
Palmisano, A.C., SooHoo, J.B., Moe, R.L., Sullivan, C.W., **Sea ice microbial communities. 7. Changes in under-ice spectral irradiance during the developments of antarctic sea ice microalgal communities,** *Marine ecology progress series,* Jan. 27, 1987 35(1-2), p.165-173, Refs. p.172-173.

Changes in spectral irradiance beneath annual sea ice were measured during the development of sea ice microalgal communities in McMurdo Sound. Five different light regimes were initially established by varying surface snow cover on 10 m x 10 m sea ice quadrats. The presence of ice algae in quadrats with <5 cm snow cover was indicated by a spectral shift with increased attenuation between 400 and 550 nm and at 671 nm, wavelengths absorbed by diatom pigments. Snow cover had a profound effect on both the rate of community development and community loss by ice ablation. A simple model of factors determining changes in ice algal biomass is described. (Auth.)

B-35445

Kottmeier, S.T., McGrath Grossi, S., Sullivan, C.W., **Sea ice microbial communities. 8. Bacterial production in annual sea ice of McMurdo Sound, Antarctica,** *Marine ecology progress series,* Jan. 27, 1987 35(1-2), p.175-186, Refs. p.184-186.

Described are: the seasonal net accumulation (from microscopical direct counts), the rate of instantaneous growth (from H-3-thymidine incorporation), and the importance of carbon production by bacteria in annual sea ice of McMurdo Sound during the 1982 spring and summer bloom of microalgae. Bacterial number and biomass increased less than 10-fold in sea ice over a period of 2 1/2 mo; yet bacterial cell production rate increased by more than 3 orders of magnitude. Bacterial growth increased throughout the microalgal bloom, but final bacterial biomass was less than 1% of microalgal biomass. Growth rates calculated from estimates of net accumulation of cells and thymidine incorporation were similar for congelation ice beneath 3 cm of snow and platelet ice beneath 0 to 5 cm of snow. Bacterial production (cell and carbon) lagged behind at first, but later paralleled the rate of primary production in sea ice. Bacterial carbon production was only 9% of primary production, while maximal rates of growth (micron = 0.02 to 0.2/d) were comparable to those reported for bacterioplankton of the southern ocean. Bacterial biomass and production in sea ice were equivalent to that found in several m of underlying seawater. Significant correlations were found between bacterial production (cell, biomass, and thymidine incorporation per cell) and growth, and microalgal biomass, production, and growth, suggesting potential coupling between bacterial growth and microalgal photosynthetic metabolism in sea ice. (Auth.)

B-35446

Copson, G.R., Rounsevell, D.E., **Abundance of Royal penguins *(Eudyptes schlegeli,* Finch) breeding at Macquarie Island,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Jan. 1987 No.41, 11p., 11 refs.

The total number of Royal penguins breeding on subantarctic Macquarie Island is estimated at 848,719 pairs based on two methods of estimation. The sizes and locations of all 57 colonies are given as a baseline for future changes in the species' abundance. Current estimates of the sizes of two colonies are compared with historical estimates made by the Australasian Antarctic Expedition in 1912-13. In the Nuggets colonies the population increased 16.5% between 1912 and 1984, a fact ascribed mainly to massive killings from before the turn of the century to 1919. (Auth. mod.)

B-35454

Cherel, Y., Stahl, J.C., Le Maho, Y., **Ecology and physiology of fasting in King Penguin chicks,** *Auk,* Apr. 1987 104(2), p.254-262, 33 refs.

Captive King Penguin chicks can fast for 5 months during the subantarctic winter with a 70% decrease in body mass. To investigate the adaptive value of this remarkable resistance to starvation, captive chicks were compared with free-ranging chicks at Possession Island, Crozet Archipelago. The chicks in the colony, from mid-Apr. to beginning of Sep. (i.e. all winter) were fed only every 39 days by their parents; some were not fed at all. In spring (Oct.-Dec.) the surviving chicks were fed every 6 days, and their growth was completed. Overall chick mortality in the colony during the winter and subsequent spring was about 50%. Mortality was highest in Oct., 6 months after the beginning of the winter, and may be attributed mainly to starvation. The decrease in body mass in the free-ranging chicks was remarkably similar to that for captive birds. The extreme resistance of King Penguin chicks to starvation in winter may be explained partly by the ability to spare proteins for several months. Other laboratory and field investigations of birds suggest that the means by which a wide variety of domestic and wild species adapt to fasting also may be interpreted in terms of three periods corresponding to changes in protein breakdown. (Auth. mod.)

B-35455

Johnston, I.A., Camm, J.-P., **Muscle structure and differentiation in pelagic and demersal stages of the antarctic teleost *Notothenia neglecta*,** *Marine biology,* Mar. 1987 94(2), p.183-190, 37 refs.

The distribution and fine structure of muscle-fiber types has been determined for the pelagic fingerling and demersal adult stages of the antarctic teleost *Notothenia neglecta* Nybelin, collected from Signy Island between Jan. and Feb. 1984. In both stages, the pectoral fin adductor muscle (m.ad.p.) is largely composed of slow fibers which contain abundant mitochondria (34 to 36%). During development, the ratio of capillaries to fibers increases less than does fiber diameter. The secondary metamorphosis from a pelagic to a demersal mode of life is associated with the disappearance of subcutaneous lipid sacs and major changes in the distribution and structure of muscle fibers in the myotomes. The trunk cross-section of adult fish is almost entirely composed of poorly vascularised fast-muscle fibers (100 capillaries/mm), which contain densely packed myofibrils (86.3%), and have few mitochondria (1.4%). Slow-muscle fibers in adults are restricted to a thin wedge adjacent to the lateral line canal. These and other morphological changes reflect a general decrease in activity and a shift from a sub-carangiform to a labriform mode of swimming following transition from the fingerling to adult stage of the life cycle. The results are briefly discussed in relation to the physiology and ecology of antarctic fish. (Auth. mod.)

B-35456

Palmisano, A.C., SooHoo, J.B., Sullivan, C.W., **Effects of four environmental variables on photosynthesis-irradiance relationships in antarctic sea-ice microalgae,** *Marine biology,* Mar. 1987 94(2), p.299-306, 36 refs.

The effects of temperature, salinity, growth irradiance and diel periodicity of incident irradiance on photosynthesis-irradiance *(P-I)* relationships were examined in natural populations of sea-ice microalgae from McMurdo Sound in the austral spring of late 1984. Both photosynthetic rate at optimum irradiance and initial slope of *P-I* curve were temperature-dependent reaching optimal rates at approximately +6 and +2 C, respectively. *P-I* relationships showed little difference at 20 and 33 per mill S; however, no measurable photosynthesis by sea-ice microalgae was detected in a 60 per mill S solution of brine collected from the upper layers of congelation ice. Although diel periodicity characteristic of the under-ice light field appeared to have little effect on *P-I* relationships, changes in growth irradiance had a profound effect. The effects of these environmental factors on ice algal photosynthesis may influence the distribution of microalgae in sea-ice environments. (Auth. mod.)

B-35462

Geĭnrikh, A.K., **Mass species of oceanic phytophagous copepods and their ecology,** *Oceanology,* Oct. 1986 26(2), p.213-217, Translated from Okeanologiia. 28 refs.

The areas in which various species of phytophagous oceanic copepods predominate in the oceans are identified. Their annual reproduction and development cycles are described. Two principal peaks in the cycles are identified. Some species are oriented toward temporary sources of resources and others to constant sources. There are variations within types. Species with both types of development are shown to be ubiquitous. (Auth.)

B-35463

Parkos, C.A., Wahrenbrock, E.A., **Acute effects of hypercapnia and hypoxia on minute ventilation in unrestrained Weddell seals,** *Respiration physiology,* 1987 67(2), p.197-207, 23 refs.

The ventilatory response to hypoxia and hypercapnia in 5 freely diving juvenile Weddell seals (age=2 years), at McMurdo Station, was studied. The ventilatory response to CO2 was brisk, with minute ventilation increasing as a linear function of end tidal CO2 with an average slope of 3.11/(min mm Hg). The ventilatory response to hypoxia was small and variable. End tidal P(O2) values as low as 28 mm Hg provoked at most a doubling of minute ventilation. These results were supported by the observation that elevated end tidal CO2 always inhibited voluntary diving whereas low P(O2) did not. Comparison of the Weddell seals' CO2 responsiveness to that of other mammals reveals similar CO2 sensitivity. It was concluded that CO2 is the major determinant of ventilatory drive in wild Weddell seals. (Auth.)

B-35464

Dhargalkar, V.K., Bhosle, N.B., **Hydrocarbons in benthic marine algae of the Vestfold Hills, Antarctica,** *Environmental contamination and toxicology. Bulletin,* Feb. 1987 38(2), p.313-317, 5 refs.

A large number of research and supply vessels visiting Antarctica may lead to the contamination of its environment due to unintentional release of petroleum products. To monitor the concentration of various pollutants in water, sediment, flora and fauna, which may also serve as baseline data for future comparison, total hydrocarbon concentration in some marine benthic algae collected from the Vestfold Hills was studied. The concentrations of THC, TOC and lipids along with standard deviations are tabulated. In general, THC concentration in all marine algal species varied from 0.24-0.106 mg/g. *Desmaristia meziesii* showed the highest concentration of THC which could be used to monitor hydrocarbon pollution.

B-35466

Franzmann, P.D., Burton, H.R., McMeekin, T.A., ***Halomonas subglaciescola,* a new species of halotolerant bacteria isolated from Antarctica,** *International journal of systematic bacteriology,* Jan. 1987 37(1), p.27-34, 18 refs.

Halomonas subglaciescola n.sp. is proposed, based on the characteristics of 29 strains of halotolerant, nonpigmented bacteria isolated from a hypersaline, meromictic lake in Vestfold Hills. These strains and 3 reference strains of halotolerant bacteria were tested for 92 attributes. The data were analyzed by numerical taxonomic procedures. The new isolates did not cluster with the three reference strains, which included the type strain of *Halomonas elongata.* However, some of the isolates did share the following attributes which are characteristic of members of the genus *Halomonas:* a guanine-plus-cytosine content of 60.9 to 62.9 mol%, halotolerance, largely oxidative mode of metabolism, motility, and peritrichous flagellation. The following are distinguishing features of the new species: cytochrome oxidase positive, no growth at 37 C, and glucose and other sugars are not utilized for growth. The type strain is strain ACAM 12 (+UQM 2926). The species has two biovars; biovar I contains motile strains and is represented by the type strain, and biovar II contains nonmotile strains and is represented by strain ACAM 21 (+UQM 2927). (Auth.)

B-35467

Mendonça-Hagler, L.C., Hagler, A.N., Phaff, H.J., Tredick, J., **DNA relatedness among aquatic yeasts of the genus *Metschnikowia* and proposal of the species *Metschnikowia australis* comb. nov.,** *Canadian journal of microbiology,* Oct. 1985 31(10), p.905-909, 22 refs.

DLC QR1.C25

DNA hybridization studies were conducted to determine the taxonomic status of the aquatic group of *Metschnikowia* species and their varieties. Among the DNAs of the 4 varieties of *Metschnikowia bicuspidata,* that of *Metschnikowia bicuspidata* var. *australis* showed 37 to 51% relative binding with the DNAs of *M. bicuspidata* var. *bicuspidata* and of the varieties *chanthamia* and *californica.* On this basis, low intervarietal fertility, and unique habitat in antarctic seawater, it is proposed to raise *M. bicuspidata* var. *australis* to the rank of species, *Metschnikowia australis,* comb. nov. Other DNA-DNA reassociation experiments showed that *Metschnikowia zobellii* is a distinct species when compared with both aquatic and terrestrial species of the genus. (Auth. mod.)

B-35472

Feeney, R.E., Burcham, T.S., Yeh, Y., **Antifreeze glycoproteins from polar fish blood,** *Annual review of biophysics and biophysical chemistry,* 1986 Vol.15, p.59-78, 64 refs.

After reviewing pertinent literature the authors find that existing experimental evidence strongly suggests that the mechanism of activity of the antarctic antifreeze glycoprotein (AFGP) molecules is the inhibition of ice growth by competitive adsorption onto the growth sites of ice. The data further suggest the blocking of the formation of large critical nuclei for ice growth. Experiments showing that the longer polymers (AFGP 1-5) have different growth-prevention properties with different types of ice than the shorter polymers (AFGP 6-8) provide additional evidence that crystal size and habits are linked to function. Four main observations have been used in AFGP studies: the ice crystal habit (size) affects the activity; AFGP is on the surface of ice crystals, as shown by surface second harmonic generation (SSHG); the presence of AFGP lowers the surface energy at the ice-solution interface; and kinetic calculations of the inhibition of ice-crystal growth fit adsorption isotherms.

B-35473

Costa, D.P., Prince, P.A., **Foraging energetics of the Grey-headed albatrosses *Diomedea Chrysostoma* at Bird Island, South Georgia,** *Ibis,* Apr. 1987 129(2), p.149-158, 47 refs.

At-sea metabolism (CO2 production) and water turnover of six breeding Grey-headed albatrosses *Diomedea chrysostoma* were measured, using the doubly labelled water method, at Bird Island, South Georgia. Mean food consumption (estimated from a water influx rate of 1.01 l/d and data on dietary composition) was 1200 g/d or 50.4 W. At-sea metabolism (derived from a rate of CO2 production of 3.98 l/h) was 27.7 W, 2.5 times the estimated basal metabolic rate (BMR). On average the birds ingested nearly twice as much food energy as they expended to obtain it. The metabolic rate during flight (estimated from at-sea metabolism and activity budget data) was 36.3 W or 3.2 times the predicted BMR. This is the lowest cost of flight yet measured, but consistent with the highly developed adaptations for economic flight shown by albatrosses. These results are briefly compared with data for other polar vertebrates (penguins, fur seals) exploiting similar prey. (Auth.)

B-35482

Lucas, P.H.C., Dingwall, P.R., **Protected areas and environmental conservation in Antarctica and the southern ocean,** Arctic Heritage Symposium, Banff, Alta., Aug. 24-28, 1985. Proceedings. Edited by J.G. Nelson, R. Needham and L. Horton, Ottawa, Association of Canadian Universities for Northern Studies, 1987, p.219-241, 21 refs.

A critical review is undertaken of the protective measures in Antarctica and the southern ocean, both in principle and practice. In the light of experience elsewhere, ways are suggested in which a comprehensive and effectively managed system of protected areas could provide adequate protection while allowing ecologically sustainable use of antarctic resources. The geographical scope of this review

includes the antarctic continent, its offshore islands and the southern ocean and islands extending north to the Subtropical convergence, which follows an irregular circumpolar line generally lying between 40-45 S. The Antarctic Convergence, which separates antarctic and temperate waters, is the conventional outer limit of the southern ocean, but the wider definition used here allows consideration of those southern temperate islands which have many ecological and conservation affinities with the true subantarctic islands. (Auth.)

B-35488

Goeke, G.D., **Amphipods of the family Ampeliscidae (Gammaridea). 6. *Ampelisca macrodonta,* a new species from the Falkland Islands,** *Biological Society of Washington. Proceedings,* Feb. 25, 1987 100(1), p.4-7, 6 refs.

An unusual new ampeliscid amphipod, *Ampelisca macrodonta,* is described from the Falkland Is. It is characterized by a series of small spines on the posterior margin of the basis of pereopod 7 and a very large tooth on the posterior corner of epimeral plate 3. The proposed new marine amphipod was collected in 3-9 m of water over mud and broken shell bottoms. (Auth.)

B-35492

Engelskjön, T., **Botany of two antarctic mountain ranges: Gjelsvikfjella and Mühlig-Hofmannfjella, Dronning Maud Land. I. General ecology and development of the antarctic cold desert cryptogam formation,** *Polar research,* Dec. 1986 4(2), p.205-224, Refs. p.223-224.

The investigated area is located between 71 45' and 72 20'S and between 1 35' and 5 33'E, from 1,080 to 2,695 m a.s.l. An outline of climate, soil chemistry and main units of vegetation is provided. Of particular importance is the wet oasis area of Jutulsessen in Gjelsvikfjella which supports cyanophyceans, green algae, lichens and the mosses *Grimmia lawiana* and *Sarconeurum glaciale,* which have developed a series of distinctive communities. The nunataks fringing the Polar plateau harbor an impoverished cyanophycean and lichen vegetation up to approximately 2,500 m a.s.l., which is the highest elevation that macroscopic plant life has hitherto been reported in Antarctica. The thermal relations of the vegetation are discussed, based on the climatological record and on local measurements during the Norwegian Antarctic Research Expedition 1984/85. Some zonal and vertical belt subdivisions are indicated for this part of Greater Antarctica.

B-35493

Sömme, L., **New records of terrestrial arthropods from Dronning Maud Land, Antarctica,** *Polar research,* Dec. 1986 4(2), p.225-229, 14 refs.

Data on the occurrence of *Eupodes angardi* Strandtmann & Sömme, *Tydeus erebus* Strandtmann (Acari, Prostigmata), and *Cryptopygus sverdrupi* Lawrence (Collembola) in Gjelsvikfjella and Mühlig-Hofmannfjella, as well as of *Maudheimia wilsoni* Dalenius (Acari, Cryptostigmata) in H.U. Sverdrupfjella and Gjelsvikfjella are presented. The four species differ in their distribution. While *E. angardi, C. sverdrupi* and *M. wilsoni* may be limited to central mountain ranges in Dronning Maud Land, *T. erebus* has been reported from 55 W to 80 E on the antarctic continent. (Auth.)

B-35494

Sömme, L., **Terrestrial arthropods of Bouvetöya,** *Polar research,* Dec. 1986 4(2), p.231-233, 13 refs.

Stevecarus evansi (Hunter) (Acari, Mesostigmata) and *Friesea tilbrooki* Wise (Collembola) are reported for the first time from Bouvetöya. At present a total of four free-living species of Acari and three species of Collembola are known from this isolated island. (Auth.)

B-35496

Crafford, J.E., Scholtz, C.H., Chown, S.L., **Insects of subantarctic Marion and Prince Edward Islands; with a bibliography of entomology of the Kerguelen biogeographical province,** *South African journal of antarctic research,* 1986 16(2), p.42-84, Refs. and bibliography p.76-84.

Twenty-six species of free-living insects representing eight orders have been recorded on the isolated, volcanic islands of the Prince Edward archipelago. A further nine species occur on Marion Island. Only four alien insect species are known from relatively pristine Prince Edward Island. The basic biology of all the insect species was studied between 1983 and 1986 during the course of an investigation of the role of insects in decomposition processes on Marion Island. Results of the study are reported here. Biologies and diagnoses of the different life stages and short taxonomic discussions for each species are provided. The zoogeography of the insect fauna, which has many diverse affinities, is reviewed and the biogeographical unity of the Kerguelen Faunal Province is stressed. The role of insects in primary consumption and nutrient and energy cycling in the terrestrial ecosystem on Marion Island is discussed. Ecological and evolutionary strategies employed by the insects are discussed with reference to various current theories such as adversity selection. An alternative approach to the standard theories on the origins of flightlessness in the insects (all the endemic species are flightless) is proposed. A list of insects parasitic on birds and mammals on the islands and a bibliography of entomology of the Kerguelen biogeographical province are provided. (Auth.)

B-35517

Watkins, B.P., Cooper, J., **Introduction, present status and control of alien species at the Prince Edward Islands, sub-Antarctic,** *South African journal of antarctic research,* 1986 16(3), p.86-94, In English with Afrikaans summary. 67 refs.

49 species of non-marine aliens (18 vascular plant species and 31 animal species, including domestic species) have been recorded at the Prince Edward Islands to date. Twenty-five species are considered to have become naturalized. Two of the alien plant species, the forb *Sagina apetala,* and the grass *Agrostis stolonifera,* are presently spreading at Marion Island. Two species of mammals have become naturalized aliens on Marion Island. Sealers accidentally introduced the house mouse *Mus musculus* in the early nineteenth century and they are now found in great numbers. In an attempt to curb the mouse problem the domestic cat *Felis catus* was introduced in 1949. They are now widely distributed over the island and attempts are underway to eradicate them. Only five alien species, an annual bluegrass, a spider, a chironomid midge, a hemipteran and a species of fly, have been recorded from Prince Edward Island. Strict measures are enforced to avoid any further introduction of aliens to this island.

B-35518

Wace, N., **Arrival, establishment and control of alien plants on Gough Island,** *South African journal of antarctic research,* 1986 16(3), p.95-101, In English with Afrikaans summary. 37 refs.

Twenty-three species of alien vascular plants had been recorded growing wild on Gough Island until November 1984. Eight species, which have all been present for at least 30 years are naturalized and widespread. Five adventive species have been found only at sites of human habitation on the coasts. These 13 species are all forbs (7) or grasses (6) having C-3 photosynthetic carbon pathways, and they include no woody or large tussock-forming plants. A further 10 casual specics have been found only once on the island. Burrowing and excreta-deposition by seabirds, and peat avalanches are the most important natural processes giving rise to regeneration sites, which are

preferentially colonized by alien plants. There is very little human disturbance of the plant cover. Control of alien plants on Gough Island requires protection of the peat mantles and the native vegetation, especially from fire. Quarantine surveillance, to exclude the import of plants or animals (particularly rats), and regular surveillance of the plant life are most important in monitoring and maintaining the integrity of the native ecosystems. (Auth.)

B-35519

Van Rensburg, P.J.J., **Control of Marion Island cat *(Felis catus)* population: why and how,** *South African journal of antarctic research,* 1986 16(3), p.110-112, 17 refs.

The effect of the disease feline panleucopaenia (FPL) as a primary control measure for feral house cats on Marion Island is evaluated, suggesting a decrease in density, lowered fecundity and a change in the population age structure. At a low cat density FPL as a biological control measure is probably not effective. The smaller cat population is still reducing the burrowing petrels and this is reflected in a change in the diet of both cats and antarctic skuas and the higher breeding success of petrels in cat free areas. Hunting as a secondary control measure seems possible at a low density and a negative growth rate of cats. Female cats could be removed and density decreased linearly with time in an intensively hunted area, with hunting success and density showing no statistical relationship. (Auth.)

B-35520

Van Aarde, R.J., **Case study of an alien predator *(Felis catus)* introduced on Marion Island: selective advantages,** *South African journal of antarctic research,* 1986 16(3), p.113-114, 18 refs.

The history and demography of the cat population on Marion Island is reviewed in an attempt to illustrate that the selective advantages possessed by the founder group contributed to the successful colonization of the sub-antarctic biome by cats. This in part resulted from the pleiotropic effects of coat color alleles on physiological and behavioral characteristics. (Auth.)

B-35521

Crafford, J.E., **Case study of an alien invertebrate *(Limnophyes pusillus* Diptera, Chironomidae) introduced on Marion Island: selective advantages,** *South African journal of antarctic research,* 1986 16(3), p.115-117, 15 refs.

Limnophyes pusillus Eaton was probably introduced into the Sub-Antarctic from Europe at a very early date. It is firmly established on at least the Prince Edward and Kerguelen archipelagos. *L. pusillus* has been studied in detail on Kerguelen, and data on the life cycle and breeding biology of this species are summarized. *L. pusillus* is eminently preadapted to the sub-antarctic terrestrial environment. Selective advantages include a long larval stage and parthenogenetic reproduction. (Auth.)

B-35522

Costa, D.P., Thorson, P.H., Herpoisheimer, J.G., Croxall, J.P., **Reproductive bioenergetics of the antarctic fur seal, *Arctocephalus gazella.*,** *Antarctic journal of the United States,* 1985 20(5), p.176-177, 10 refs.

During the austral summers of 1983-84 and 1984-85, the reproductive bioenergetics of the antarctic fur seals were examined at Bird I. Specific parameters quantified include milk intake of pups, change in milk composition through time, metabolism and protein catabolism of fasting pups, sub-adult males and females, energy expenditure of lactating females onshore and while foraging. Using the oxygen-18 doubly-labcled water method, the at sea ADMR of eight adult females was measured to be 787 kJ/kg-day in 1983-84. The fasting metabolic rate of lactating and fasting females was 415 kJ/kg-day. In addition, the fasting metabolic rate of eight sub-adult animals, ranging in mass from 15.1 kg to 38.4kg, exhibited a mean fasting metabolic rate of 569 kJ/kg-day. Mass change data indicate that in 1983-84 the rate of mass increase was significantly less than in 1984-85. Females appear to compensate for reduced prey intake and mass gain by increasing the foraging trip duration until a predefined body mass set point has been achieved. The mean composition of antarctic fur seal milk was water 42.8%, fat 40.3% and protein 17.4%.

B-35523

Friedmann, E.I., **Field studies of antarctic cryptoendolithic microbial ecosystems, 1984-1985,** *Antarctic journal of the United States,* 1985 20(5), p.178-179, 7 refs.

In the "Ross Desert" of southern Victoria Land, cryptoendolithic microorganisms colonize porous Beacon sandstone and are a primary agent in the characteristic weathering of the rock surface. Conspicuously colonized, very extensive rock surfaces were found in the sandstone formations surrounding Alatna Valley (Convoy Range), especially in the massive sandstone cliffs of Battleship Promontory, in the course of a survey during the 1984-1985 austral summer. The presence of extensive microbial colonization of sandstone surfaces in the northern parts of the "Ross Desert" is a further indication of the widespread occurrence of the cryptoendolithic community. The biology of the cryptoendolithic ecosystem is the subject of a cooperative research effort of the antarctic cryptoendolithic microbial ecosystem research group, an interdisciplinary grouping of independent scientists.

B-35524

Friedmann, E.I., McKay, C.P., **Method for the continuous monitoring of snow: application to the cryptoendolithic microbial community of Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.179-181, 14 refs.

As part of a concentrated effort to study the cryptoendolithic microbial community, automatic data-acquisition systems were developed, capable of year-round recording of biologically significant environmental data. To monitor the water cycle in the rocks, a method of detecting both moisture in the rocks and snowfall was required. In this paper, a simple, reliable method for detecting the presence of snow on rock surfaces is described. The study site is Linnaeus Terrace on the southern slope of Wright Valley, an area particularly rich in cryptoendolithic microbial life. A simple qualitative snow monitor, based on measuring conductivity of a salt-impregnated porous disc placed on the surface rocks, is described and shown. It is pointed out that the instrument monitors the presence of snow on the disc rather than the amount of snow or snowfall. Yet, for characterization of the biological effect of snow, it is the snow cover on the rocks (rather than the amount of fallen snow that may be removed by wind or sublimation) that is the significant parameter.

B-35525

Vestal, J.R., **Effects of light intensity on the cryptoendolithic microbiota,** *Antarctic journal of the United States,* 1985 20(5), p.181-182, 4 refs.

Photosynthetic activity of the cryptoendolithic microbial community in Beacon sandstone at Linnaeus Terrace was studied under controlled conditions, including the effects of light intensity, up to about 1,000 microEinsteins per sq m/s, on the metabolic incorporation of bicarbonate with carbon-14 into the cellular lipids of the microbial community. In addition, the *incorporation* of C-14-bicarbonate into a stable cellular component, the lipids, was used to measure the metabolic activity of the microbiota. The results may help to explain how these physical factors affect the metabolism of the microbiota in nature. It is found that metabolic activity is a function of temperature and light intensity; appreciable activity is seen at 15 C. Even at 0 C, measurable activity is seen. It is concluded that the cryptoendolithic microbiota would be metabolizing at appreciable rates within the rock in nature when the temperature, moisture, and

light conditions permit. Exposure to various light intensities would affect the metabolism of the rock microbiota but not be inhibitory to the primary producers in this delicate environment.

B-35526

Hirsch, P., Gallikowski, C.A., Friedmann, E.I., **Microorganisms in soil samples from Linnaeus Terrace, southern Victoria Land: preliminary observations,** *Antarctic journal of the United States,* 1985 20(5), p.183-186, 15 refs.

The microbial composition of 13 soil samples from Linnaeus Terrace was investigated. Enrichments in oligotrophic media of different pH and concentration were kept at various temperatures and light intensities. Subcultures on agar yielded a large variety of bacteria, filamentous fungi, yeasts and some algae. Soils from an area contaminated with human urine contained mainly spore-forming bacteria and yeasts which grew best at pH 7-8 and at 18-26 C. Uncontaminated soils collected near rock boulders had a rich microflora of mainly pigmented bacteria. These grew well between pH 5.5 and 8.0 and between 4 and 10 C but failed to grow at 30-31 C. Soils from underneath rock boulders showed poor microbial growth or were nearly sterile. Generally, the soil surface was less colonized than lower strata. Light stimulated growth of the heterotrophic and often pigmented bacterial population. Several hundred single colony isolates are currently purified and will be identified later. (Auth.)

B-35527

Lawrence, J.M., McClintock, J.B., **Variability in vegetative and reproductive biomass in *Acaena adscendens* Vahl. (Rosaceae) at Kerguelen (South Indian Ocean),** *Antarctic journal of the United States,* 1985 20(5), p.186-187, 6 refs.

The rosaceous herb *Acaena adscendens* currently covers much of the eastern part of the Courbet Peninsula on the large island of Grande Terre at Kerguelen. In January 1982, *A. adscendens* was collected from various populations in the vicinity of Port-aux-Français. The total biomass of the individual plants and of their structural components was measured. The number of blossoms was determined to indicate the fecundity of the plants. *A. adscendens* from the different populations differed distinctly in the biomass allocated to various structural components, the total biomass, and the number of blossoms. Plants with the highest level of vegetative growth and those with the lowest level of vegetative growth were not reproductive. Reproduction by *A. adscendens* occurs in those locations where production is sufficient for reproduction, but not so great that reproduction is completely inhibited.

B-35528

Lawrence, J.M., **Biomass of *Curvillea antarctica* (Cham.) Hariot (Phaeophyceae) in the Bay of Morbihan, Kerguelen Island (South Indian Ocean),** *Antarctic journal of the United States,* 1985 20(5), p.188, 10 refs.

The genus *Durvillea* is a member of the Phaeophyceae, the brown algae. It is conspicuous in the austral regions by its formation of a belt on high-energy rocky shores. The wet weights of three components of *D. antarctica* collected in December 1984 were measured in the Bay of Morbihan. Even in the smallest individuals, most biomass is found in the blade, and the differential allocation of material there becomes even more pronounced with growth. The disc and stipe increase in size also but much more slowly. The biomass of the blades of *D. antarctica* at Kerguelen Island was larger than found by Santelices et al. (1980) for plants in Chile that had a similar stipe diameter. Several populations of *D. antarctica* were censused; the greatest biomass was 264 kg wet weight/sq m of a population with a density of 474 individuals/sq m.

B-35585

Neugebauer, W., Bykowski, P., Neugebauer, E., **Krill chitin and some aspects of metals transport in antarctic sea water,** *Polish polar research,* 1986 7(4), p.371-376, 6 refs.

Concentration of Zn, Cu, Cd, Pb and Co have been determined in South Shetland Is. waters and in krill exoskeletons with the help of atomic absorption spectrophotometry. Concentrations of these metals both in sea water and in krill exoskeleton are in order Zn>Cu>Cd>Ni>Pb>Co. Comparing concentrations of these metals in sea water to their concentrations in krill exoskeleton, the factors have been calculated giving a list of metals in the order of krill chitin ability, which is Ni>Cu>Zn>Cd>Pb>Co accumulation. The highest accumulation factors for Ni and Cu point to the special role played by these metals in krill life. (Auth.)

B-35587

Pietr, S.J., **Physiological groups of microorganisms in different soils at Admiralty Bay region (King George Island, South Shetland Islands, Antarctica),** *Polish polar research,* 1986 7(4), p.395-406, 25 refs.

Microorganisms were tested in different soils near Admiralty Bay. The physiological groups of microorganisms were restricted by the kind of organic matter. There were found in ornithogenic soils in higher number the following groups of microorganisms: proteolytic bacteria, uric acid and L-asparagine ammonifying bacteria, chitin degrading bacteria, lecithin degrading bacteria and calcium phosphate dissolving bacteria. The nitrifying bacteria were found in lower horizons of ornithogenic soils in higher number. The nitrogen fixing bacteria were found in mineral soils covered by plant associations, only. The spore-forming bacteria were detected in ornithogenic soils and in soil influenced by man. (Auth.)

B-35588

Kawecka, B., **Ecology of snow algae,** *Polish polar research,* 1986 7(4), p.407-415, 35 refs.

The biology, ecology and mechanism of adaptation to life under cold conditions of snow algae are reviewed, considering the influence of such factors as temperature, light, nutrients and ice. Survival, blooms, productivity, and vertical and geographical distribution are discussed. It is found that there are distinct differences between the distribution of snow algae in the Northern Hemisphere and those in the Southern Hemisphere, *Chlandomonas nivalis* being found chiefly in the North, while in Antarctica the red cryoseston consists primarily of *Chlamydomonas antarcticus.*

B-35592

Higashi, S., Johnson, R.M., **Effect of growth temperature on esterase patterns in psychrotrophic *Bacillus* species and other Gram-positive genera,** *Antonie van Leeuwenhoek,* 1986 52(6), p.519-524, 12 refs.

The growth temperature of *Bacillus stearothermophilus* was previously reported to affect the esterase band pattern obtained after gel electrophoresis. In this study gel electrophoresis of esterase was done on a group of antarctic bacterial strains cultivated at different temperatures to investigate whether band shift due to a change in growth temperature was a general phenomenon or limited only to select groups. Most strains studied were in the *Bacillus* genus. Standard strains of known *Bacillus* species and other Gram-positive genera were examined for comparative purposes. A change in the esterase band pattern was observed as a result of variation in growth temperature. Two major esterase bands were dominant in this diverse group of species. (Auth.)

B-35593
Ochyra, R., Bartlett, J.K., **Identity of *Drepanocladus fontinaliopsis* (C. Muell.) Broth. ex Par. (Bryopsida, Amblystegiaceae),** *New Zealand journal of botany,* 1986 24(3), p.361-368, 18 refs.

Drepanocladus fontinaliopsis (C. Muell.) Broth. ex Par., a species described from Kerguelen Is., is synonymous with the polymorphous *D. fluitans* (Hedw.) Warnst. New Zealand plants commonly named *D. fontinaliopsis* are identical to *D. fluitans* var. *berggrenii* (C. Jens. in Lange et C. Jens.) C. Jens. in Weim., a variety characterized by having a variable costa, including the occurrence on the same plant of unicostate leaves mixed with leaves having double, forked, or spurred costae. *Drepanocladus fluitans* var. *kutcharokensis* Kanda, a variety described from Hokkaido, Japan is also synonymous with *D. fluitans* var. *berggrenii. Drepanocladus fontinaliopsis* var. *flaccidus* K. W. Allison, a variety described from the North Island of New Zealand, is a highly modified aquatic expression of *Sphagnum falcatulum* Besch. (Auth.)

B-35594
Edgar, E., ***Poa* L. in New Zealand,** *New Zealand journal of botany,* 1986 24(3), p.425-503, 40 refs.

The cosmopolitan genus *Poa* L. is revised for New Zealand. Of the 46 species recognized, 35 are indigenous, with all, except *P. cookii* of Macquarie, Kerguelen and Heard Is. endemic to the New Zealand Botanical Region.

B-35597
Wasilewski, A., **Ecological aspects of the breeding cycle in Wilson's storm petrel *Oceanites oceanicus* (Kuhl) at King George Island (South Shetland Islands, Antarctica),** *Polish polar research,* 1986 7(3), p.173-216, 18 refs.

The period from arrival of Wilson's petrel to its breeding grounds to the onset of breeding covered 33 days (Nov. 5-Dec. 8). The egg-laying period averaged 56 days; the frequency distribution of egg laying in different colonies was close to normal. Incubation took 44 days, on the average, and chicks stayed in the nests 59 days. The weight of chicks at hatching was 7.5 g, and the maximum weight was 80 g, that is 205% of adult weight. Growth rate of chicks depended on weather conditions, especially on the amount of snowfall blocking the access to the nest. This caused many-day starvation of chicks and their weight could drop by 46%. The diet of chicks and adults consisted of krill in 96%, mostly of *Euphausia superba*. High nesting losses were caused by rainfall and snowfall. Of 129 nesting attempts, 61.2% failed in the stage of eggs and 27.9% in the stage of chicks. Mortality was related to the age and weight of chicks. It is believed that the prolonged egg-laying period, rapid growth rate of chicks in their first days, and their high weight represent adaptations to the climate of Antarctica. (Auth.)

B-35598
Jablonski, B., **Distribution, abundance and biomass of a summer community of birds in the region of the Admiralty Bay (King George Island, South Shetland Islands, Antarctica) in 1978-1979,** *Polish polar research,* 1986 7(3), p.217-260, 18 refs.

In the region of Admiralty Bay, 12 nesting bird species were encountered, a total of 40,890 pairs, and biomass amounting to about 395,000 kg. Three penguin species constituted 91.7% in abundance, their biomass constituting 98.7% of the whole community. Densities of abundance and biomass of adult birds in relation to the living area of penguins (i.e. 775 sq km) ranged from 32.3 to 121.4 indiv./sq km and from 115.1 to 473.0 kg/sq km.

B-35599
Czykieta, H., Kittel, W., Witek, Z., Wolnomiejski, N., **Biological characteristics of the population of *Euphausia superba* Dana from the southern part of the Drake Passage and the Bransfield Strait carried out during the BIOMASS-SIBEX expedition (Dec. 1983-Jan. 1984),** *Polish polar research,* 1986 7(3), p.261-273, 12 refs.

In the investigated area krill occurred in low abundance. It was recorded mainly above the shelf and above the continental slope close to the Palmer Archipelago and near the northern shores of Elephant I. In the central part of Bransfield Strait, *E. superba* was caught in especially small quantities. In general krill of small size occurred, the size decreasing from the west to the east. Mature krill was dominant in the western part of the investigated area, juveniles in the eastern part. Gravid females were caught very rarely. (Auth.)

B-35600
Kolakowski, E., **Seasonal variation of autoproteolytic activity in the antarctic krill, *Euphausia superba* Dana,** *Polish polar research,* 1986 7(3), p.275-282, 23 refs.

Seasonal changes in the krill *(Euphausia superba* Dana) autoproteolytic activity were followed throughout the year. Using the kinetic formula for the first order reaction, the initial reaction rate, the rate after 5 minutes and the average reaction rate after 0, 5, 10, 15 and 20 min of incubation of mixed homogenate at 40 C were determined in each sample. Changes in the krill autoproteolytic activity over the year were found to follow a sinusoid with a maximum during the austral summer and a minimum during the austral winter. The maximum initial reaction rate was about 10 times the minimum initial rate, which is an evidence of a considerable seasonal variation in the krill autoproteolytic activity associated presumably with the krill feeding intensity. (Auth.)

B-35601
Bykowski, P., Kowalczuk, M., **Fluoride content in the antarctic krill *(Euphausia superba* Dana) in relation to its biological condition and to the fishery region,** *Polish polar research,* 1986 7(3), p.283-287, 11 refs.

An attempt at assessing the correlation between the content of fluoride in krill from various fisheries, and its biological condition, was carried out. Fluoride was determined with the Dolan method, which was modified by the authors. No statistically significant correlation was found between the degree of sexual maturity and fluoride content. There was no decisive statistical relation between the body weight and body length of individuals and the content of fluoride. (Auth.)

B-35602
Filho, L.X., Kolakowska, A., Vincente, C., **Carotenoid composition of *Caloplaca regalis* (Vain.) Zahlbr. *(Lichenes)* and of penguin faeces at King George Island (Antarctica),** *Polish polar research,* 1986 7(3), p.289-294, 12 refs.

Carotenoid composition of both penguin faeces and the lichen *Caloplaca regalis* has been analyzed by thin layer chromatography. Carotenoids in both samples are almost identical to those found in krill, the main food of penguins, including beta-carotene, which is not found in other *Theloschistaceae* species. (Auth.)

B-35603
Czeczuga, B., Gutkowski, R., Czerpak, R., **Investigations on carotenoids in lichens. 5. Lichens from Antarctica,** *Polish polar research,* 1986 7(3), p.295-303, 19 refs.

Carotenoids in six species of lichens *(Xanthoria elegans, Caloplaca regalis, Usnea antarctica, U. fasciata, Himantormia lugubris* and *Ramalina terebrata)* have been investigated by means of column and chin-layer chromatography. The following carotenoids were found:

beta-carotene, alpha- and beta-cryptoxanthin, canthaxanthin, lycophyll, lycoxanthin, lutein, lutein epoxide, zeaxanthin, antheroxanthin, adonixanthin, diatoxanthin, rhodoxanthin, rhodoxanthin derivative, alpha-doradexanthin, astaxanthin, astaxanthin ester, mutatochrome, mutatoxanthin and cryptoflavin. Most frequently occurred beta-carotene, beta-cryptoxanthin, lutein epoxide, zeaxanthin and mutatoxanthin. The total carotenoid content ranged from 10.242 *(Ramalina terebrata)* to 18.700 mg/g dry weight *Himantormia lugubris)* in Oct., and from 4.765 *(Ramalina terebrata)* to 12.462 mg/g dry weight *(Caloplaca regalis)* in Feb. (Auth.)

B-35604

Siciński, J., **Application of the dendrite analysis in the discussion on the biogeography of the Antarctic,** *Polish polar research,* 1986 7(3), p.305-317, 14 refs.

The method of construction and division of dendrites proposed by Florek et al. (1951) was used for defining antarctic biogeographic areas. The affinity matrices of Knox and Lowry (1977) resulting from the analysis of the distribution of antarctic *Polychaeta* and *Amphipoda* were taken as a basis for dendrite construction. The results of the present analysis are compared with the conclusions of these authors, and similarities and differences are discussed on the background of published biogeographic divisions of Antarctica. (Auth.)

B-35605

Ochyra, R., Afonina, O.M., **Taxonomic position and geographical distribution of *Grimmia andreaeopsis* C. Muell. *(Grimmiaceae, Musci)*,** *Polish polar research,* 1986 7(3), p.319-332, 19 refs.

Grimmia andreaeopsis C. Muell., a member of the genus *Schistidium,* is described and illustrated. Its many characteristics which distinguish it from its closest relatives from the species of *S. strictum* complex are pointed out. Unlike most rupestral species of *Schistidium, G. andreaeopsis,* also known as *S. andreaeopsis,* grows in wet arctic fens. A comparison of *S. andreaeopsis* with the subantarctic *S. angustifolium* (Mitt) Herz is made and these species are considered to be closely related, but not conspecific, bipolar counterparts. Also, a comparison with the South Georgian *S. urnulaceum* (C. Muell.) Bell and the Holarctic species of *S. strictum* complex, which are characterized by having similar leaf cell patterns, is made. *S. andreaeopsis* has a circumpolar distribution. (Auth. mod.)

B-35607

Mimura, T., **Fatty acids and sterols of the tunicate, *Salpa thompsoni,* from the antarctic ocean: chemical composition and hemolytic activity,** *Chemical and pharmaceutical bulletin,* Nov. 1986 34(11), p.4562-4568, 10 refs.

The fatty acid and sterol compositions of the marine tunicate *Salpa thompsoni* from the antarctic ocean are reported. Of the 21 fatty acids identified, the acids 16:0, 20:5*omega*3, and 22:6*omega*3 were present at high concentrations. The salpa also contained various C25, C27, C28, and C29 sterols with three *delta*5-sterols. The presence of eight related pairs of *delta*5-sterols and 5*alpha*-stanols with identical side chains was characteristic. Desmosterol and sitostanol (or C-24 epimer) were found for the first time in salpas. Furthermore, the hemolytic active components of methanol extract of the salpa were examined. The total fatty acids fraction was strongly hemolytic, and detailed examination of each component acid showed the polyunsaturated acids 22:6*omega*3 and 20:5*omega*3 to be most potent. (Auth.)

B-35608

Lazzaretto, I., Libertini, A., **Karyotypes of two populations of the genus *Tisbe* (Copepoda Harpacticoida) from the Kerguelen Islands** [Les caryotypes de deux populations du genre *Tisbe* (Copepoda, Harpacticoida) des Îles Kerguelen], *Vie et milieu,* June 1986 36(2), p.91-95, In French with English summary. 10 refs.

The same diploid number 2n=22 has been established in both populations of the genus *Tisbe,* called *Tisbe* sp., population A, form *pallida,* and *Tisbe* sp., population B, form *pigmentata,* from the Kerguelen region. The two populations differ in chromosome morphology: *Tisbe* sp., population A, form *pallida* possesses 8 metacentric, 2 submetacentric and one acrocentric chromosome pair: *Tisbe* sp., population B, form *pigmentata* presents 7 metacentric, 2 submetacentric, one acrocentric and one subtelocentric chromosome pairs. The 2 populations differ significantly in the length of the period between metaphase I and metaphase II, providing further support for the idea that these two populations are two different taxonomic entities. These populations are also the first among the known species of the genus *Tisbe* to display acrocentric chromosomes. (Auth.)

B-35610

Smith, V.R., **Production and nutrient dynamics of plant communities on a subantarctic island. 1. Standing crop and primary production of mire-grasslands,** *Polar biology,* 1987 7(2), p.57-75, Refs. p.73-75.

Investigations of the seasonal changes in vegetation standing crop have enabled an assessment of annual net primary production (ANP) for two mire-grasslands at Marion I. Mire-grasslands are a conspicuous part of the island's vegetation, occurring on waterlogged peats, and being dominated by graminoid and bryophyte species. Aboveground ANP's were 883 g/sq m/y and 570 g/sq m/y for the two study sites and a substantial proportion of these values was due to bryophyte production. Total (above- plus belowground) ANP's were 2178 g/sq m/y and 1117 g/sq m/y, greater than values reported for most graminoid and bryophyte-dominated tundra and tundra-like communities of the Northern Hemisphere and also greater than the ANP at many grasslands from more temperate areas. Concise descriptions are provided of the island's climate and vegetation and the sub-Antarctic is compared with the sub-Arctic based on parameters most likely to influence primary production. (Auth.)

B-35611

Wägele, J.-W., **Description of the postembryonal stages of the antarctic fish parasite *Gnathia calva* Vanhöffen (Crustacea: Isopoda) and synonymy with *Heterognathia* Amar & Roman,** *Polar biology,* 1987 7(2), p.77-92, 11 refs.

The postembryonal stages of *Gnathia calva* Vanhöffen 1914 (Crustacea: Isopoda: Gnathiidea) are described. The setation of antennae, pereopods and tail fan does not change much during development from the first praniza to the adult animals, while mouthparts, pleopods and habitus show the typical gnathiid sexual dimorphism. For the first time an immature male is described. It is identical with the stage on which the genus *Heterognathia* Amar & Roman was erected; the latter is therefore considered to be a junior synonym of *Gnathia* Leach. *G. calva* is very frequent in the benthos of the upper 500 m of the Weddell Sea. It had formerly often been overlooked because it lives in sponges. (Auth.)

B-35612

Harrington, S.A., Thomas, P.G., **Observations on spawning by *Euphausia crystallorophias* from waters adjacent to Enderby Land (East Antarctica) and speculations on the early ontogenetic ecology of neritic euphausiids,** *Polar biology,* 1987 7(2), p.93-95, 22 refs.

Observations on spawning, brood size, egg size and hatchability are presented for 5 *E. crystallorophias* females. The specimens were collected in vertical hauls through holes made in sea ice in late 1985 at the edge of the continental shelf off Enderby Land. The spawning took place between Nov. 12 and Dec. 2. Two females spawned more than once during the experiment; 79% and 100% hatchability is reported. Eggs developed to nauplius in 7.5-10 days; the size of the eggs was a mean diameter of 0.60 mm. The eggs are neutrally buoyant in seawater, in contrast to other neritic euphausiids, which is attributed to different types of early ontogenetic ecology. The process of developmental ascent may isolate the early larval stages of oceanic euphausiids from the adults, thereby reducing the occurrence of intraspecies predation among omnivorous species, as in the case of *Euphausia superba.*

B-35613

Broady, P., Given, D., Greenfield, L., Thompson, K., **Biota and environment of the fumaroles on Mt. Melbourne, northern Victoria Land,** *Polar biology,* 1987 7(2), p.97-113, Refs. p.112-113.

The aim of this investigation was to provide a general description of the biota and environment of fumarolic ground close to the summit (2733 m) of Mt Melbourne. Heat flow through the ground was examined and analyses made of the physico-chemical properties of the soil. Bryophyte vegetation comprised *Campylopus pyriformis* (K.F. Schultz) Brid. and *Cephaloziella exiliflora* (Tayl.) Steph. The former is a new antarctic record. These grew as scattered and confluent cushions where surface ground temperatures ranged between 14-31 C. Algae were epiphytic on bryophytes and formed crusts over most other areas of warm ground. Six species of cyanophytes and 5 unicellular chlorophytes are described. The majority were mesophilic but *Mastigocladus laminosus* showed a strong preference for soil temperatures >30 C. A loosely lichenized chlorophyte was also encountered. The only soil fauna was a testate amoeba, *Corythion dubium.* Heterotrophic microorganisms included thermotolerant fungi, actinomycetes and bacteria as well as typical mesophilic microflora. Nitrogen fixation, analyzed using both C2H2 reduction and N2-15 enrichment, occurred in bryophyte cushions and surface algal crusts containing *M. laminosus* and in sub-surface samples lacking cyanophytes. The biota are compared with those found at other thermal localities in Antarctica and the dispersal of propagules to these areas is discussed. (Auth.)

B-35614

Grobbelaar, J.U., **Diel study of carbon flow in the pelagic zone of a small lava-lakelet on Marion Island (sub-Antarctic),** *Polar biology,* 1987 7(2), p.115-124, Refs. p.123-124.

Various biotic and abiotic measurements were made over a 48-h period in a small lava-lakelet on Marion I. Typical oligotrophic conditions prevailed, with low biomass values and rates of productivity for the phytoplankton and bacteria. The bacteria and phytoplankton were subject to heavy zooplankton grazing pressures, which in turn were responsible for rapid carbon turnover rates in the lava-lakelet. Diel cycles were observed in bacterial production and algal photosynthesis, with higher rates during daytime. No definite pattern could be seen for the zooplankton, either in terms of filtering rates or migratory activities. Phytoplankton productivity and zooplankton grazing and respiration were responsible for the greatest flow of carbon. Zooplankton occupied the top of the intermediate food chain and dominated the "live" organic carbon content of the water. A cycling index of 44% indicated a fairly closed system where most components were important in determining the overall structure of the system. (Auth.)

B-35615

Smith, V.R., **Production and nutrient dynamics of plant communities on a subantarctic island. 2. Standing crop and primary production of fjaeldmark and fernbrakes,** *Polar biology,* 1987 7(3), p.125-144, Refs. p.143-144.

Investigations of the seasonal changes in vegetation standing crop have enabled an assessment of annual net primary production (ANP) at a fjacldmark, open fernbrake and closed fernbrake at Marion I. These communities represent a successional sequence on relatively dry ridges and slopes on the island. Together, they are representative of a large proportion of the island's lowland (c. 300 m above sea level) vegetation. Aboveground ANP's were 728 g/sq m/y at closed fernbrake, 502 g/sq m/y at open fernbrake and 226 g/sq m/y at fjaeldmark. Total (above-plus below) ANP's were 1958 g/sq m/y, 1578 g/sq m/y and 685 g/sq m/y, respectively. These values are greater than those found for most tundra and tundra-like shrub and dwarf shrub-dominated communities of the Northern Hemisphere. The island's oceanic climate ensures a long growing season (c. 300 days for vascular plants, 365 days for bryophytes). Production efficiencies (0.7% to 2.1% of photosynthetically active radiation) were in the range reported for Northern Hemisphere subpolar vegetations. (Auth. mod.)

B-35616

Palmisano, A.C., Simmons, G.M., Jr., **Spectral downwelling irradiance in an antarctic lake,** *Polar biology,* 1987 7(3), p.145-151, Refs. p.150-151.

Spectral downwelling irradiance (400-700 nm) was determined in the ice-covered Lake Hoare located in the dry valleys near McMurdo Sound. Full waveband PAR beneath the ice was <3% of surface downwelling irradiance. Maximum light transmission just beneath the 2.6-4 m ice cover, which contained sediments and air bubbles, occurred between 400-500 nm. In the water column below, attenuation of light by phytoplankton in the 400-500 nm region and between 656-671 nm suggested absorption of light by algal pigments. (Auth.)

B-35617

Hughes, J.M.R., **Distribution and composition of vascular plant communities on Heard Island,** *Polar biology,* 1987 7(3), p.153-162, 27 refs.

Six major higher plant communities are defined for sub-antarctic Heard I.: tussock grassland, meadow, herbfield, pool complex, cushion-carpet, fellfield. The communities were mapped at a scale of 1:-50,000, using color aerial photographs and field observations. The floristic composition of 12 vegetation transects and of 30 sample quadrats along these is used to describe the communities and identify dominant or indicator species. The vegetation is compared with that of other sub-antarctic islands. (Auth.).

B-35618

Krebs, W.N., Lipps, J.H., Burckle, L.H., **Ice diatom floras, Arthur Harbor, Antarctica,** *Polar biology,* 1987 7(3), p.163-171, Refs. p.171.

Sea-ice microflora was collected from Dec. 1971 to Nov. 1972 from a variety of types of sea ice in the vicinity of Arthur Harbor, Anvers Island, Antarctic Peninsula. Sixty-seven identifiable species of diatoms, one silicoflagellate and several archaeomonads were recovered from the ice. Of these, only 24 diatoms and the archaeomonads were considered to be truly cryophilic based on their occurrence and abundance. Q-mode factor analysis revealed that 4 factors (species occurrences) account for 89% of the data. In a general way, these four factors are related to ice type—shore ice protected from turbulence, grounded pack ice, slush ice and sea ice. Shannon-Wiener species diversity functions range from 0.000 (monospecific) to 3.-0515 (dominance divided among 9 species). Diversity also appeared to be related to ice type—protected shore ice was low, sea ice was intermediate, and grounded pack, exposed shore ice and slush were

highest. Short-term variability in physical/biotic environment may control species diversity. Sea-ice assemblages may be useful in paleoclimatic interpretations of past ice distributions. (Auth.)

B-35619

Culik, B., **Fluoride turnover in Adélie penguins *(Pygoscelis adeliae)* and other bird species,** *Polar biology,* 1987 7(3), p.179-187, Refs. p.186-187.

Fluoride concentrations found in soft tissues of free ranging birds are below 10 mg/kg d.w. In ducks *(Anas platyrhynchos)* 99.5% of all fluoride is bound in the skeleton. Krill-eating Adélie penguins *(Pygoscelis adeliae)* reached equilibrium concentrations in the order of 10,000 mg F/kg d.w. in femur. Fluoride uptake with the diet is buffered by the skeleton where it has a half-life of 3-4 weeks. Fluoride from fresh krill does not reach the organs of Adélie penguins to the same extent as NaF. Most fluoride remains bound to the krill cuticle and is not absorbed by the penguin gut during digestion. The availability of krill fluoride was in the range of 21-30% for muscle and 48-68% for femur of Adélie penguins as compared to NaF (100%). The role of the salt glands in fluoride excretion is negligible. The uptake of approx. 240 mg F daily with the krill diet is balanced by excretion via the cloaca. (Auth.)

B-35621

Synowiecki, J., Sikorska-Siondalska, A., El-Fath El-Bedawey, A., **Adsorption of enzymes of krill chitin modified with carbon disulfide,** *Biotechnology and bioengineering,* Feb. 20, 1987 29(3), p.352-354, 10 refs.

Krill chitin modified with carbon disulfide was used as a support of enzymes. The dithiocarbamino groups created after reaction of CS2 with chitinous NH2 can participate in binding the enzymes without denaturation and loss in activity. The stability of these bonds depends on pH and decreases gradually at ionic strengths higher than 0.01. Chitin modified with CS2 can be used as a support for enzymes having high activity at mild conditions of pH and ionic strength. (Auth.)

B-35622

Clarke, A., Holmes, L.J., **Lipid content and composition of some midwater crustaceans from the southern ocean,** *Journal of experimental marine biology and ecology,* Dec. 31, 1986 104(1,2,3), p.31-51, Refs. p.50-51.

In decapods and mysids examined, the lipid contents were generally very high: 5 to 25% fresh weight in immature and male *Pasiphaea scotiae,* 7 to 17% in *Acanthephyra pelagica* and up to 20% in both *Gnathophausia gigas* and *Petalidium foliaceum.* Carotenoid pigment contents were also high compared with benthic decapods. In most species the major storage lipid was wax ester, although in *Pasiphaea scotiae* triacylglycerol was of equal or greater importance. Fatty acid compositions were typical of marine invertebrates from pelagic and shallow-water benthic habitats, although *P. scotiae* and *Acanthephyra pelagica* contained substantial levels of 20:1 in the triacylglycerol. Wax ester alcohol compositions were unusual in that both 20:1 and 22:1 were present as a suite of positional isomers. The variation in lipid content and composition with sex and season in both *Pasiphaea scotiae* and *Acanthephyra pelagica* indicated that the major factor influencing lipid storage in these organisms was the pattern of food availability, although they would clearly also benefit from the associated increased buoyancy. High-latitude midwater crustaceans contain much more lipid than the same or related species from lower latitudes. This parallels the increasing seasonality of production towards the poles, indicating that this seasonality influences the biology of the underlying mesopelagic community. (Auth. mod.)

B-35623

Peck, L.S., Morris, D.J., Clarke, A., Holmes, L.J., **Oxygen consumption and nitrogen excretion in the antarctic brachiopod *Liothyrella uva* (Jackson, 1912) under simulated winter conditions,** *Journal of experimental marine biology and ecology,* Dec. 31, 1986 104(1,2,3), p.203-213, Refs. p.212-213.

The metabolism of the antarctic brachiopod *Liothyrella uva* (Jackson, 1912) has been investigated in the laboratory under simulated winter conditions of low temperature and no food. The oxygen consumption of a brachiopod of 35 mm length is low when compared with other brachiopods, antarctic invertebrates or starved temperate invertebrates. Ammonia excretion was also low. The slopes of the allometric relationships against ash-free dry weight were 0.72 for oxygen consumption and 0.75 for ammonia excretion. These slopes were not significantly different from each other, or from 0.75. The mean overall oxygen:nitrogen ratio was 9.3, which suggests that protein was being used as the main metabolic substrate. A preliminary biochemical study of brachiopods collected from Signy I. showed only small scasonal changes in lipid and carbohydrate, but there were marked changes in protein content in the later stages of winter. This confirms that, at least in late winter, *L. uva* survives primarily by the utilization of protein. (Auth. mod.)

B-35628

Everson, I., **Life in a cold environment,** Antarctic science, D.W.H. Walton, ed., Cambridge, Cambridge University Press, 1987, p.69-137, 12 refs. (p.272-273).

DLC G860.A555 1987

Light, ice, water chemistry, and snow are some of the ecological factors with which natural antarctic populations must cope. Keys to survival in cold environments are adaptations in living patterns, primary and secondary productivity, growth and reproductive strategies, and physiological adaptations in freezing resistance, enzyme activity, metabolism, and thermoregulation. The complex antarctic food web is described with krill being the critical factor. Exploitation by the whaling and sealing industries is reviewed as is the decline of those industries in recent years to all but total cessation as increased conservation pressures resulted in protection agreements. Interest has shifted to possible krill harvesting so that similar agreements may become necessary to assure ample supplies for the many species that rely on krill for sustenance.

B-35641

Brown, C.R., **Feather growth, mass loss and duration of moult in Macaroni and Rockhopper Penguins,** *Ostrich,* Sep. 1986 57(3), p.180-184, 14 refs.

The development of new feathers, loss of body mass and the duration of moult were investigated in Macaroni Penguins *Eudyptes chrysolophus* and Rockhopper Penguins *E. chrysocome* at Marion I. New feathers began developing under the skin before the birds returned ashore to moult, and only began protruding through the skin about five days later when they were already over half their final length. Feather synthesis was complete by 21 days after the birds returned ashore. Loss of body mass was similar to previous observations for the species, but previous reports on the duration of moult do not take into account that moult begins while the birds are still at sea. (Auth.)

B-35642

Brooke, M. de L., Klages, N., **Squid beaks regurgitated by Greyheaded and Yellownosed albatrosses, *Diomedea chrysostoma* and *D. chlororhynchos,* at the Prince Edward Islands,** *Ostrich,* Dec. 1986 57(4), p.203-206, 15 refs.

Squid regurgitated by Greyheaded and Yellownosed albatrosses at the Prince Edward Is. were predominantly two onychoteuthid spe-

cies, *Kondakovia longimana* and *Moroteuthis knipovitchi.* Both squid are characteristic of cold, antarctic waters and may have been caught south of the Antarctic Convergence, some 350 km to the south of the breeding station. Both albatross species regurgitated similar squid (by species and size), and these squid were similar to those found in previous studies of the diet of Wandering, Sooty and Lightmantled Sooty albatrosses at the Prince Edward Is. (Auth.)

B-35645

Ino, Y., Nakatsubo, T., **Distribution of carbon, nitrogen and phosphorus in a moss community-soil system developed in a cold desert in Antarctica,** *Ecological research,* 1986 Vol.1, p.59-69, 18 refs.

The distributions of carbon, nitrogen and phosphorus in a moss community-soil system developed on a naked region in Rundvågskollane were investigated in order to analyze the flow of matter in an antarctic terrestrial ecosystem. The moss community was formed from many moss blocks of different sizes and was composed of *Bryum pseudotriquetrum* (Hedw.) Gaertn., Meyer et Scherb., *Ceratodon purpureus* (Hedw.) Brid. and *Grimmia lawiana* J.H. Willis. The surface of the community was covered with cyanobacteria. It was estimated that nitrogen fixed by cyanobacteria flowed from these organisms to the moss and that little nitrogen was transported within the moss body. A large amount of phosphorus existed in the soil. The moss community had a high phosphorus content although the amount itself was relatively little due to the small phytomass. It seems that absorption of phosphorus from soil is difficult for moss, because of the paucity of water necessary for the movement of phosphorus and the suppressed growth of moss due to the arid conditions. (Auth.)

B-35646

Ochi, H., Ochyra, R., ***Bryum dichotomum* Hedw., a species new to the Antarctic,** *Lindbergia,* 1986 11(2-3), p.157-160, 27 refs.

The occurrence of *Bryum dichotomum* Hedw. in the Antarctic botanical zone is established on the basis of seven collections from the Admiralty Bay region of King George I. The antarctic plants are illustrated, described, and notes on the taxonomy and ecology are given. (Auth.)

B-35647

Kanda, H., **Flora and vegetation of mosses in ice-free areas of Soya Coast and Prince Olav Coast, East Antarctica,** *Hikobia,* 1981 Suppl.1, p.91-100, Refs. p.99-100.

The flora and geographical distribution of mosses in the Showa Station area were studied for about 20 years. The following aspects were realized in the relationships between the moss species and their distribution: *Bryum pseudotriquetrum* and *Ceratodon purpureus* are distributed throughout the area of Showa Station and its vicinity; *Bryum argenteum* and *Pottia heimii* occur more frequently on the Prince Harald Coast than on Prince Olav Coast; *Pottia austro-georgica* is found only on Prince Harald Coast and *Grimmia lawiana* is more abundant on Prince Olav Coast. The depth of moss turfs was measured in some areas of both coasts. Some of the environmental conditions in an area usually have a great influence upon the depth of moss turfs. The topographic and ecological features are described on the moss vegetation at "Magoke Point" of Skallen region, Prince Harald Coast. The moss community in Cape Ryugu, Prince Olav Coast is phytosociologically elucidated and the vegetation is classified into five communities as follows: *Grimmia lawiana* Sociation, *Grimmia lawiana-Ceratodon purpureus* Sociation, *Ceratodon purpureus* Sociation, *Ceratodon purpureus-Bryum pseudotriquetrum* Sociation and *Bryum pseudotriquetrum* Sociation. Two types of patterned grounds associating with moss vegetation were found in the moraine zone of Cape Ryugu and their ecological effects are considered. (Auth.)

B-35648

Kanda, H., **Antarctic species of *Ceratodon* collected from King George Island, South Shetland Islands, Antarctica,** *Hikobia,* 1986 No.9, p.319-325, Refs. p.324-325.

Antarctic species of *Ceratodon* were studied based on the specimens collected from the Potter Cove and Admiralty Bay, King George I. Two species of *Ceratodon, C. antarcticus* Card. and *C. grossiretis* Card., are recognized and their descriptions, illustrations and taxonomic discussions are given. *Ceratodon kinggerogicus* was described as new to science. It is well characterized by the narrow leaves with distinct costa which is usually not reaching the leaf apex and autoicous sexuality. *Ceratodon validus* (Card.) Horikawa et Ando was reduced to a form of *C. grossiretis.* (Auth.)

B-35650

Toyoda, S., Enokido, M., Matsumae, A., Aiso, M., **Microbiological investigation of the human pollution at Syowa Station in Antarctica. Special reference to the specimen collected by the 23rd Japanese Antarctic Research Expedition. Pt.2,** *Journal of antibacterial and antifungal agents,* 1985 13(12), p.541-546, In Japanese with English summary. 11 refs.

Microbiological investigations of human pollution were conducted at Showa Station. The following results were obtained from 68 sampling sites: *E. coli* was not found but other bacteria, actinomycete, and fungi were detected. The number of bacteria, actinomycete, and fungi increased near the station. Four hundred and fifty-two strains isolated from soil specimens consisted of 86.7% of gram positive bacteria and 13.3 % of gram negative bacteria. Most of the bacteria belonged to *Corynebacterium-Rothia* group, *Bacillus, Pseudomonas,* and *Micrococcus.* Most of the fungi were shown to belong to *Cladosporium* and *Penicillium.* The other genera were few. The bacteria were grown at 4-18 C, but some bacteria, 19% of the isolates, were able to grow at 37 C. (Auth.)

B-35653

Hoshiai, T., ed, Ohyama, Y., ed, **Proceedings of the eighth Symposium on Polar Biology, 1985,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, 261p., Refs. passim. For selected papers see B-35654 through B-35657, B-35659 through B-35680, and J-35658, or 41-3630 through 41-3636.

The eighth Symposium of Polar Biology was held at the National Institute of Polar Research, Tokyo, Dec. 4-6, 1985. A total of 120 scientists participated and 41 papers were presented in the oral session and 4 in the poster session; 27 of these, included in this volume, are pertinent to Antarctica. The Symposium comprises a session on marine biology and one on terrestrial biology. Investigations of the terrestrial biota were carried out in the ice-free areas in the vicinity of Showa Station by JARE, concurrently with BIOMASS. The topics of marine biology are based on the coastal marine ecosystem research, carried out in the Showa Station area during 1982 to 1984 winters, and research on board the *Kaiyo Maru* and the *Shirase* which took part in SIBEX II in the 1984-85 summer. (Auth.)

B-35654

Taniguchi, A., Hamada, E., Okazaki, M., Naito, Y., **Distribution of phytoplankton chlorophyll continuously recorded in the JARE-25 cruise to Syowa Station, Antarctica (SIBEX I),** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.3-14, 22 refs.

The geographical distribution of chlorophyll *a* on a finer scale over semi-global ranges was investigated. A prototype of continuous

measuring-recording system was designed and built in the icebreaker *Shirase* and rich data on chlorophyll distribution were collected. Diel variation of chlorophyll in the antarctic ocean was also documented. The results obtained confirm gross patterns of the geographical distribution and diel variation reported by many previous authors. New findings include: relationships of chlorophyll to temperature are quite variable among different sea areas, diel variation is less intense in the coastal area where a 12-hour periodicity is influential, and occurrence of a certain hydrographic condition which enhances phytoplankton productivity in the area between the Agulhas Convergence and the Subtropical Convergence south of South Africa. (Auth.)

B-35655

Fukuchi, M., Fukuda, Y., Ohno, M., Hattori, H., **Surface phytoplankton chlorophyll distribution continuously observed in the JARE-26 cruise (1984/85) to Syowa Station, Antarctica (SIBEX II),** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.15-23, 11 refs.

A continuous measuring-recording system of surface chlorophyll *a,* which is equipped with a personal computer, was used in JARE-26 cruise of the icebreaker *Shirase* in 1984-1985 as part of the Second International BIOMASS program. Geological distribution of chlorophyll *a* observed on the southward leg through the eastern part of the Indian Ocean in early-middle Dec., and that on the northward leg through the western part of the ocean in late Feb.-early Mar., coincided with the previous JARE observations. Comparing the data obtained on both legs, seasonal difference was also indicated; level of chlorophyll was high in Dec. but low in Feb.-Mar. Maximum concentration reached 1.55 microgram/l north of the Antarctic Convergence in Dec. Variable, positive or negative relationships between temperature and chlorophyll *a* were observed in the zones of the Subtropical Convergence, Subantarctic Front and Antarctic Convergence. (Auth.)

B-35656

Fukuda, Y., Ohno, M., Fukuchi, M., **Surface chlorophyll *a* distribution in marginal ice zone in Antarctica, 1984/85,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.24-33, 9 refs.

Chlorophyll *a* concentrations of surface layer were measured at 108 stations in waters south of 63 S, including the pack ice and the fast ice regions along the course of the *Shirase* during the 1984-85 austral summer where high chlorophyll *a* concentration was observed between late Dec. and early Jan. This high value seems to be related to the release of ice algae which proliferated at the bottom part of the sea ice. In ice-free areas, chlorophyll *a* concentration decreased abruptly and became low. After two or three months, the high concentration of chlorophyll *a* was observed again within Lützow-Holm Bay and Breid Bay. The growth of the planktonic algae seems to occur in these regions during the austral summer. (Auth.)

B-35657

Satoh, H., Watanabe, K., **Photosynthetic nature of ice-algae under fast ice near Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.34-42, 24 refs.

The photosynthetic nature of the ice-associated microalgal assemblages (ice-algae) was investigated in the annual sea ice area near Showa Station. Results demonstrate the low-light-adaptation of ice-algae under the exceedingly low light conditions, which are largely controlled by the thickness of snow covering the fast ice as well as by solar radiation. The optimum temperature for photosynthesis of the ice-algae was about 8 C, while the rates of photosynthesis decreased at higher temperatures. (Auth. mod.)

B-35659

Matsuda, O., Ishikawa, S., Kawaguchi, K., **Experimental decomposition of particulate organic matter collected under the fast ice in Lützow-Holm Bay, Antarctica, with special reference to the fate of carbon, nitrogen and phosphorus,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.55-66, 20 refs.

To estimate the *in situ* degradation, decomposition experiments of various kinds of particulate matter collected under the fast ice near Showa Station were conducted at -1.5 C from Feb. to Oct. 1984. The variations of Chl. *a,* carbon, nitrogen, phosphorus and oxygen consumption were particularly noted. Among the samples, particulate materials obtained by sediment traps set under the fast ice showed the most active decomposition compared with net plankton and surface sediment. In the decomposition of trapped sediment, two steps of first order reaction are given. Results indicate a fairly fast *in situ* decomposition of particulate organic matter under the fast ice. (Auth. mod.)

B-35660

Kawaguchi, K., Ishikawa, S., Matsuda, O., **Overwintering strategy of antarctic krill *(Euphausia superba* Dana) under the coastal fast ice off the Ongul Islands in Lützow-Holm Bay, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.67-85, 25 refs.

During the BIOMASS study of the SIBEX (1984/85), some aspects of overwintering strategies of antarctic krill were studied in the Kita-no-ura Cove in Lützow-Holm Bay. Krill were collected monthly with a light trap from May through early Nov. 1984. Krill under the coastal fast ice survive the food deficient antarctic winter principally by the following strategies: changing their habitat from the pelagic to the benthopelagic during the dark period to subsist on detritus on the sea bed; lowering their oxygen consumption rate down to the level of 0.27 ml/g dry wt/h. They show positive phototaxis, swim actively in the darkness, and probably extend their food retention time in the gut in late fall and early winter. Their C and N composition, C:N ratio and fatness are supposed to be mainly effected by the change in metabolic rate and reflect their nutritional condition. The difference in metabolic dynamics of krill between fall and winter to early spring period was recognized through the seasonal change in C and N composition. (Auth.)

B-35661

Yamada, S., Kawamura, A., **Some characteristics of the zooplankton distribution in the Prydz Bay region of the Indian sector of the antarctic ocean in the summer of 1983/84,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.86-95, 16 refs.

Vertical hauls with a WP-2 net were made at various stations, usually from 100 m to the surface and from 500 m to the surface. In the catches of 100-0 m layer, in Dec. 1983, it was shown that the abundance of the total zooplankton in terms of both individual number and wet weight per sq m was largest in the Subantarctic and the Antarctic Convergence regions, where chl *a* was remarkably high. This high abundance is mainly due to the ontogenetic migration of the major copepod species from deeper layers. The individual number and wet weight of total zooplankton in Jan. 1984, became 64.5 and 38.8% of those in Dec. This accompanied a decrease in all taxonomic groups. In Copepoda occupying more than 60% of the total zooplankton abundance throughout this investigation, there was observed

a distinct decrease in their wet weight in Jan., showing 35.1% of the weight in Dec., while the individual number showed a little decrease during the same period. The geographical and seasonal changes in the abundance of *C. acutus, R. gigas, C. propinquus* and *M. gerlachei* were related to their growth and ontogenetic migration, which largely influenced the abundance of total zooplankton in the 100-0 m layer during the austral summer. (Auth. mod.)

B-35662

Ishii, H., **Feeding behavior of the antarctic krill, *Euphausia superba* Dana. 2. Effects of food condition on particle selectivity,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.96-106, 21 refs.

Effects of particle size distribution, total particle concentration, and animal size on selective feeding of krill, *Euphausia superba* Dana, were studied using natural particles as food. Percent particle retention efficiency calculated from the filtering rate for each particle size spectrum increased abruptly for large size particles. This selective feeding for large particles was apparent regardless of abundance of smaller particles. However, the minimum particle size with 50% retention efficiency (half-retention size) increased with increasing total particle concentration. These results suggest that the feeding of the krill shows intensive selection for large particles when food is abundant, but its feeding is rather passive when food is scarce. This flexible feeding seems to be an adaptive behavior to obtain the energy more effectively in the food scarce ocean. (Auth.)

B-35663

Endo, Y., Imaseki, T., Komaki, Y., **Biomass and population structure of antarctic krill *(Euphausia superba* Dana) collected during SIBEX II cruise of R.V. *Kaiyo Maru*,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.107-117, Refs. p.116-117.

Juvenile and adult *Euphausia superba* were collected in the northwest of the Antarctic Peninsula, eastern Drake Passage, and the Scotia and Weddell Seas during the SIBEX II cruise of R.V. *Kaiyo Maru.* Average biomass estimated from blind tows was 145 g/1000 cu m (838 g/1000 cu m, if aimed tows were included). The biomass was especially abundant along the Antarctic Peninsula, in the east of Elephant I. and west and southeast of South Sandwich Is. *E. superba* wet weight represented 88% of total wet weight from blind tows (99%, if aimed tows were included). Copulated females and males with developed spermatophores were numerous along the Antarctic Peninsula and in the west of South Sandwich Is. Copulated females were rather abundant off Queen Maud Land, although male maturity was not high. Juveniles were almost absent in the northwest of the Antarctic Peninsula and in eastern Drake Passage; in number they were dominant in the west and southeast of South Sandwich Is. (Auth.)

B-35664

Hoshiai, T., Tanimura, A., **Sea ice meiofauna at Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.118-124, 6 refs.

Meiofauna composed mainly of copepods, larvae of some invertebrates and occasionally a ciliate in the bottom layer of the sea ice was observed in the vicinity of Showa Station. The copepods that appeared were *Paralabidocera antarctica,* three species of harpacticoid, *Ctenocalanus vanus, Oithona similis* and *Oncaea curvata* in the order of abundance. *P. antarctica* and harpacticoid species occurred continuously throughout the winter season. The maximum abundance of copepods was 218,000/sq m in Sep. 1975. The yearly fluctuation of their abundance was remarkable. *P. antarctica* grew in the sea ice possibly feeding on ice algae. The ecological relation of harpacticoid species to the sea ice was not clear but a close relationship was presumed. *C. vanus, O. similis* and *O. curvata* seemed to be temporal constituents of the meiofauna. (Auth.)

B-35665

Maihara, Y., Endo, Y., **Laboratory observations on molting and growth of antarctic krill, *Euphausia superba* Dana,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.125-127, Extended abstract. 9 refs.

Thirty-five specimens of *Euphausia superba* were transported alive from the antarctic waters to Japan and subjected to laboratory experiments for molting and growth. Three feeding regimes were established. Mean intermolt periods showed no significant differences among groups; generally, the intermolt period is longer at lower water temperature. The value obtained in this study, 21.7 days, is close to those with similar experimental temperature. Starved animals showed significantly longer intermolt periods than fed animals. Daily growth rates were variable among the 3 groups. Maximum daily growth rate estimated in this study is 0.053 mm/day. Results are presented in tables.

B-35666

Kubodera, T., Okutani, T., **New and rare cephalopods from the antarctic waters,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.129-143, Refs. p.140-141.

Three species of antarctic cephalopods, *Grimpoteuthis antarctica* n.sp., male specimens of *Megaleledone senoi* Taki and *Gonatus antarcticus* Lönnberg are described with some considerations to their systematic status. Two plates with photographs of *Grimpoteuthis antarctica* n.sp. and *Megaleledone senoi* are included. (Auth. mod.)

B-35667

Numanami, H., Hamada, E., Naito, Y., Taniguchi, A., **Biomass estimation of epifaunal megabenthos by stereophotography around Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.145-150, 9 refs.

Biomass estimation of epifaunal megabenthos was made with stereographic photographs which were taken at 4 stations in the Showa Station area in Jan. 1984. The size of individuals was measured with reading of photographs and then it was converted into the wet weight based on the size-weight relationship for each species. The values of the equilibrium constant and the initial growth index were computed for the direct measurement of size and weight of preserved samples. The total biomass estimated at the station 16 m deep in the Kita-no-seto Strait, the stations 40 and 80 m deep in the Kita-no-ura Cove and the station 200 m deep in the Ongul Strait was 791, 2834, 1984 and 423 g/sq m, respectively. These are considered reasonable figures for the epifaunal megabenthos in the antarctic coastal waters. Application of underwater stereophotography is considered to be one of the effective methods for the biomass estimation of epifaunal megabenthos. (Auth.)

B-35668

Iwami, T., **Note on the nasal structures of fishes of the suborder notothenioidei (Pisces, perciformes),** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.151-152, Extended abstract.

It is reported that all 5 families of the suborder Notothenioidei—the Bovichthyidae, Nototheniidae, Harpagiferidae, Bathydraconidae and Channichthyidae—have a single external nostril and that there is an accessory nasal sac associated with the main cavity. This structure is described and illustrated.

B-35669

Tanabe, S., Miura, S., Tatsukawa, R., **Variations of organochlorine residues with age and sex in antarctic minke whale,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.174-181, Refs. p.180-181.

Concentrations of polychlorinated biphenyls (PCBs) and *p,p'*-DDE were determined in the blubber of antarctic minke whale collected during the 1984-1985 whaling season and found to be in the ranges of 3.1 to 29 ng/g and 13 to 140 ng/g on wet weight basis, respectively. These values were much lower in comparison with those of this species in the Northern Hemisphere. The female animals older than 15 years of age revealed low residue levels in contrast to mature males, probably due to the lactational excretion of these organochlorines. However, such excretion seems to be lesser in minke whales than in small cetaceans because of the smaller difference of organochlorine levels between mature males and females of the former. The concentration ratios of DDE to PCBs were found to be higher in immature minke whale than in mature animals indicating the possibility that the feeding grounds of immature animals extend further north from the antarctic ocean. (Auth.)

B-35670

Honda, K., Yamamoto, Y., Tatsukawa, R., **Heavy metal accumulation in the liver of antarctic minke whale *(Balaenoptera acutorostrata)*,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.182-184, Extended abstract. 6 refs.

Accumulation of heavy metals in antarctic minke whales, caught in the antarctic ocean during the summer whaling seasons of Nov. 1980 to Feb. 1981 and Nov. 1984 to Mar. 1985 was studied in order to elucidate the transfer processes of heavy metals in the antarctic marine ecosystem. The contents of heavy metals (Fe, Mn, Zn, Cu, Pb, Ni, Co, Cd, and Hg) in the liver of *B. acutorostrata* were determined by atomic absorption spectrophotometry, and their concentration levels varied widely among the individuals, especially for Fe, and were related to age, sex, body size and also with the sexual status of the matured female. Tabulated data are presented.

B-35671

Ishikawa, S., Matsuda, O., Kawaguchi, K., **Snow algal blooms and their habitat conditions observed at Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.191-197, 9 refs.

Correlations between snow algal blooms and their habitat conditions were studied at Showa Station in the austral summer of 1984. The study site was under artificial eutrophication by the nutrients derived from seal carcasses. Snow algal blooms occurred abundantly in the places where the meltwater was staying and permeating, and in the upper and under layers of the surface of unconformity where the meltwater was flowing down, but they were not always abundant around the seal carcasses. The concentrations of chlorophyll-*a* showed significant correlations with those of phosphate-P and ammonium-N. (Auth.)

B-35672

Akiyama, M., Ohyama, Y., Kanda, H., **Soil nutrient condition related to the distribution of terrestrial algae near Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.198-201, Extended abstract. 2 refs.

Examination of the relation between water content and nutrients and the terrestrial epipsammic algae and coexisting free living algae in the soil is reported, using 4 sets of soil samples collected in the vicinity of Showa Station. In the lake shore samples, a positive correlation between water content and chlorophyll concentration in the soil was observed. Concentration of chlorophyll *a* which was derived mainly from epipsammic algae and negigibly from free living algae was high in the soaked soil and decreased in the dry soil distant from the water body. The number of the free living algae mainly comprising Chlorophyceae and Xanthophyceae was large at the station close to the shore line and decreased in the dry soil distant from the shore. Soil samples obtained from areas including Adélie penguin rookeries showed that chlorophyll concentration was high in the eutrophicated soil around the rookery compared with the intact soil of East Ongul.

B-35673

Shin, M., Sakihama, N., Ogawa, T., Takahashi, E., **Biochemical studies of antarctic algae: detection of ferredoxin by high performance liquid chromatography,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.202-208, 4 refs.

Two clones of *Chlorella* (A1 and A2) were isolated from an algal mat collected from a fresh-water pond, Lake Yukidori, Langhovde, and were cultured in the laboratory. Ferredoxins were isolated from these *Chlorella* cells and analyzed by high performance liquid chromatography (HPLC) using TSK-gel Phenyl-5PW column for hydrophobic chromatography and a DEAE-5PW column for ion-exchange chromatography. *Chlorella* A1 cells contained two distinct ferredoxins separable by hydrophobic but not by ion-exchange chromatography. *Chlorella* A2 cells also contained two distinct ferredoxins whose retention times in the hydrophobic HPLC analysis were different from those of ferredoxins in A1 cells. Ferredoxins were also isolated directly from an algal mat collected at another fresh-water pond, Lake Skallen Ôike, Skallen. Results suggest that the algal mat contains at least two cyanobacterial and one non-cyanobacterial species. (Auth. mod.)

B-35674

Ohtani, S., **Epiphytic algae on mosses in the vicinity of Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.209-219, 17 refs.

Species composition and abundance of epiphytic algae on mosses growing in the vicinity of Showa Station were investigated. Moss samples were collected from three localities, East Ongul I., Mukai Rocks and Langhovde. Twenty-three species of epiphytic algae were identified in these samples: 16 blue-green algae, 4 diatoms and 3 green algae. Blue-green algae were more frequently found among these epiphytic algae on mosses in each locality. Among the three localities, Langhovde was the most favorable habitat for epiphytic algae, as well as the moss vegetation. The epiphytic algal flora on mosses turned out to be poorer than submerged algal flora in the same or similar localities in the Antarctic. (Auth.)

B-35675

Kanda, H., Ochi, H., **Fruiting plants of *Bryum* found in the vicinity of Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.220-228, 9 refs.

Fruiting plants of *Bryum* are recorded for the first time in the vicinity of Showa Station. These were collected at 4 localities along Sôya Coast: Rundvågshetta, Strandnibba, Einstödingen and Langhovde. Specimens from the Showa Station area were compared with those from other polar regions, especially with respect to the morphological features of peristome teeth and spores. The fruiting plant was concluded to be *Bryum amblyodon* C. Muell., which is a new addition to the bryaceous flora of continental Antarctica. (Auth.)

B-35676

Kanda, H., **Moss communities in some ice-free areas along the Soya Coast, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.229-240, 11 refs.

The moss vegetation in three ice-free areas, Einstödingen, Rundvågshetta and Strandnibba along the Prince Harald Coast, was investigated phytosociologically and the vegetation was classified into the following nine communities: *Bryum pseudotriquetrum* Sociation, *Ceratodon purpureus* Sociation, *C. purpureus-B. pseudotriquetrum* Sociation, *B. argenteum* Sociation, *B. argenteum-B. pseudotriquetrum* Sociation, *Pottia heimii* Sociation, *P. heimii-B. pseudotriquetrum* Sociation, *Grimmia lawiana* Sociation, and *G. lawiana-C. purpureus* Sociation. The *B. argenteum* Sociation and the *P. heimii* Sociation were newly recorded in this study. The moss vegetation on the small island, Einstödingen, consists of five sociations, and it is characterized by the *P. heimii-B. pseudotriquetrum* Sociation and the *B. argenteum* Sociation. Rundvågshetta is characterized by pure communities of the *P. heimii* Sociation and the *G. lawiana* Sociation. The moss vegetation of Rundvågshetta, where seven sociations were recognized, may be one of the most prominent in both the Prince Harald Coast and the Prince Olav Coast. (Auth.)

B-35677

Imura, S., Kanda, H., **Gemmae of the mosses collected from Syowa Station area, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.241-246, 17 refs.

In three species of mosses collected from the Showa Station area 3 types of gemmae were found: one- to two-celled gemmae on protonemata of *Grimmia lawiana,* filamentous gemmae on rhizoids of *Ceratodon purpureus.* The development of gemmae of these two mosses seems to be effected by the infection of algae or lichens. Multicellular, spherical to ellipsoidal gemmae (tubers) were observed on rhizoids of *Bryum* sp. submerged in some ponds. (Auth.)

B-35678

Seki, T., **Subantarctic elements of the bryophytes in East African Highlands,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.247-253, 29 refs.

Disjunctive distribution of some bryophytes between East African Highlands and the subantarctic region is discussed. The subantarctic bryophytes in East African Highlands can be classified into 3 groups: group 1 includes species growing on wet rocks in periglacial environment; group 2 includes those growing on trunks and rocks of forests; and group 3 which is represented by *Aongstroemia julacea,* and is found on bare land. The bryophytes of Groups 1 and 2 seem to be old elements which have originated from Gondwanaland. (Auth. mod.)

B-35679

Nakatsubo, T., Ino, Y., **Distribution of nitrogen in moss communities in East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.257-258, Extended abstract.

The distribution of nitrogen in moss communities developed on ice-free areas in East Antarctica was investigated to analyze the nitrogen cycling in the antarctic ecosystem. Organic carbon and total nitrogen in a moss-soil system of Rundvågskollane were analyzed with a C-N corder. Maximum carbon content and maximum nitrogen content of the moss layer were 6.84 and 0.457%, respectively. There was a very significant relationship between the carbon and the nitrogen contents in each group, but the regression coefficients were different. The nitrogen content of the moss block was measured for moss communities collected from various ice-free areas. The communities grew actively and looked green. Each community was horizontally divided into three layers: green layer (G), brown undecomposed layer (B1) and brown decomposed layer (B2). The nitrogen content of the green layers varied considerably even among the same species. The nitrogen content of the B1 layer was always lower than that of the G layer in the same community.

B-35680

Shishida, Y., Ohyama, Y., **Note on the terrestrial nematodes around Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.259-260, Extended abstract. 8 refs.

Some nematode specimens were isolated from mosses and algae which were sampled in the vicinity of Showa Station in 1983, and the following 3 species were identified: *Plectus antarcticus* de Man, 1904, which is endemic to the Antarctic, having been recorded from soil and mosses in the coastal ice-free areas of the Ross Sea region, Bunger Hills and Gaussberg; *Plectus frigophilus* Kiryanova, 1958, which has the longest and widest body in the genus *Plectus,* and *Scottnema lindsayi* Timm, 1971. The genus *Scottnema* is endemic to the Antarctic, and might have been differentiated there from the common ancestor sharing with the genus *Acrobeles.*

B-35699

Scully, R.T., Brown, W.Y., Manheim, B.S., **Convention for the conservation of antarctic marine living resources: a model for large marine ecosystem management,** Variability and management of large marine ecosystems. Edited by K. Sherman and L.M. Alexander, Boulder, Westview Press, 1986, p.281-286.

DLC QH541.5.S3V35

The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), which entered into force in 1982, represents an effort to develop and apply an ecosystem-wide management approach to the waters surrounding Antarctica. CCAMLR is an innovative agreement. It applies to an area whose definition rests more on an ecological premise than upon political or economic considerations. It aims at ensuring that the harvesting activities are consistent with the health of not only target populations but also of the populations of dependent and related species and with the maintenance of ecological relationships. The 3 conservation principles that guide harvesting and associated activities south of the Antarctic Convergence, set forth in Article II of the Convention, are discussed in detail. (Auth. mod.)

B-35711

Walton, D.W.H., **International symposium on subantarctic terrestrial ecosystems,** *Polar record,* Jan. 1987 23(145), p.442-444.

Highlights of papers presented at an international symposium on the terrestrial ecosystems of Antarctica and the subantarctic islands, held Sep. 8-11, 1986, in France, are summarized. The 34 papers presented were not limited to the Subantarctic; eight dealt wholly or partly with antarctic material. The range of subjects was very wide, but ornithology and arthropod ecology and physiology were the dominant themes.

B-35716

Vosjan, J.H., Nieuwland, G., Ernst, W., Bluszcz, T., **Shipboard comparison of two methods of extraction and measurements of ATP applied to antarctic water samples,** *Netherlands journal of sea research,* 1987 21(2), p.107-112, 9 refs.

During the antarctic winter expedition of the German R.V. *Polarstern* around Elephant I. and west of the Antarctic Peninsula in May-June 1986, two research groups measured adenosine triphosphate (ATP) in the water column by different methods: boiling in Tris buffer or extraction with NRB These two methods gave similar results. The sample volume for the determinations, however, caused differences in the observed concentrations of ATP. Abundance and perhaps behavior of organisms and the size of the sample will determine the upper boundary of the size of organisms in the sample. The Tris extraction values for 500 cu cm showed more scatter and slightly higher means than those of the NRB-method for 25 cu cm samples. The estimated amounts of ATP down to 3700 m depth were 45.1 mg/sq m and 53.9 mg/sq m as measured by the NRB and Tris method, respectively. Hence the biomass of small organisms in this area in May-June 1986 will have been about 11.5-13.5 gC/sq m over a 3700 m water column. (Auth.)

B-35718

Feller, G., Gerday, C., **Metabolic pattern of the heart of haemoglobin- and myoglobin-free antarctic fish *Channichthys rhinoceratus*,** *Polar biology,* June 1987 7(4), p.225-229, Refs. p.229.

Maximum activities of energy metabolism related enzymes, myofibrillar ATPase and concentrations of carnitine, lipids and myoglobin have been assayed in heart and white muscle of the ice-fish *Channichthys rhinoceratus.* Results are compared with those of the red-blooded *Paranotothenia magellanica.* Increased activities of glycolytic enzymes and extremely high lactate dehydrogenase activity have been found in icefish heart, suggesting a substantial involvement of anaerobic glycolysis under conditions of oxygen depletion. During normoxia, ATP generation is achieved via oxidative pathways of carbohydrate or fatty acid catabolism. Possible implication of the myocardium in homeostatic regulation by lactate oxidation is also discussed. (Auth.)

B-35719

Cuzin-Roudy, J., **Gonad history of the antarctic krill *Euphausia superba* Dana during its breeding season,** *Polar biology,* June 1987 7(4), p.237-244, 24 refs.

The gonad history of krill, collected in Jan.-Feb. 1986, north of Prydz Bay, was reconstructed from observations of live krill maintained on board ship, and subsequently fixed for histology. Size, molt-stage and external stage of sexual maturity were recorded for each individual. Males appeared to be continually producing sperm. Among mature females, the ovaries had various compositional zones: germinal zones and 1 to 3 batches of maturing oocytes (in primary or secondary vitellogenesis) were simultaneously present. Therefore a female can successively lay at least three batches of eggs, at short intervals corresponding to the duration of one cycle of secondary vitellogenesis. Most post-spawn females had reverted to juvenile status (ovary reduced to germinal zones). Large females were found with an already reorganized ovary with numerous secondary oogonia and very young oocytes. It is concluded that oogenesis occurs before the winter rest and that only the vitellogenetic cycles are postponed until the next reproductive season. (Auth.)

B-35720

McClintock, J.B., **Investigation of the relationship between invertebrate predation and biochemical composition, energy content, spicule armament and toxicity of benthic sponges at McMurdo Sound, Antarctica,** *Marine biology,* Apr. 1987 94(3), p.479-487, Refs. p.486-487.

The predominant organic constituent of sponges was soluble and insoluble protein. Levels of total protein ranged from 17.0 to 55.9% dr. wt. Levels of lipid and carbohydrate were low, ranging from 2.1 to 9.6 and and 0.6 to 3.5% dr. wt, respectively. Levels of ash were high and variable (32 to 79% dr. wt), reflecting species-specific differences in spicule contents. Insoluble protein accounted for the greatest contribution to the energetic composition of the sponges, while lipid and carbohydrate combined contributed to less than 25% of the overall energy. Normalized spicule volumes of sponges ranged from 0.15 to 0.38 cu cm/g dr. wt. Ichthyotoxicity assays indicated that 9 (56%) of 16 antarctic sponge species were toxic. The most highly toxic species were *Mycale acerata* and *Leucetta leptorhapsis.* Although the asteroid *Perknaster fuscus antarcticus* specializes on the highly toxic, fast-growing *M. acerata,* most antarctic sponge-eating predators appear to be generalists which feed on the more abundant, non- to mildly-toxic, sponge species. This feeding strategy is based on exploitation of low energy, sedentary prey, which require a minimal energy output to harvest. (Auth. mod.)

B-35726

Benninghoff, W.S., **Antarctic ecosystem,** *Environment international,* 1987 13(1), p.9-14, 24 refs.

The antarctic continent is the principal heat sink of the world weather machine. Upwelling areas of the southern ocean recycle nutrients and stimulate the marine ecosystem, and seasonal changes in extent of sea ice contribute to one of the greatest annual pulses in marine organic production. The fish fauna has only 120 species but these belong to 29 families. The zooplankton is rich in several endemic crustacea, notably the antarctic krill. The only vertebrates on land come from the sea onto shore areas and fast ice, including colonies of breeding penguins and associated birds as well as seals. Closed communities of vascular plants and cryptogams occur on subantarctic islands and the Antarctic Peninsula, but in the entire continental Antarctic the vegetation is desert-like, composed of scattered mosses, lichens, and terrestrial algae. Exposed surfaces of crystalline rocks harbor "endolithic microbial life," and a few species of invertebrates dwell on favorably exposed soil and under rocks. The ice plateau is as nearly abiotic or sterile as any area on the earth's surface. The physical and biotic features of Antarctica represent extreme conditions. (Auth. mod.)

B-35729

Hempel, G., **BIOMASS,** *Environment international,* 1987 13(1), p.27-31, 6 refs.

The Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS) is a ten-year program organized by various nongovernmental international organizations with the Scientific Committee on Antarctic Research and the Scientific Committee on Oceanic Research being the key sponsors. The program was initiated in 1976; its continuation beyond 1986 is presently under consideration. The general scope of BIOMASS is broadly directed towards a deeper understanding of the antarctic marine ecosystem, but is focused mainly on the krill populations. The most important achievement of BIOMASS is the development of international cooperation in the biological investigation of the southern ocean. (Auth. mod.)

B-35730
Hempel, G., **Krill-dominated pelagic system of the southern ocean,** *Environment international,* 1987 13(1), p.33-36, 20 refs.

The krill-dominated pelagic system of the seasonal pack-ice zone of the Antarctic Eastwind Drift and the Weddell Gyre is characterized by high concentrations of phytoplankton and krill (amongst other zooplankton) and warm-blooded top consumers. Krill, birds, and mammals are "giants" with high mobility and energy demands, slow growth, low reproduction, and a long life span. The high standing stock of krill and its consumers and their localized dense concentrations attract exploitation by man, but the low net production makes the system susceptible to overfishing. The system appears to be food limited at the adult stage of krill and its consumers. Fluctuations in abundance occur particularly at the larval phase of krill. The juvenile and adult phases are also subject to substantial spatial variations in abundance which affect any kind of harvesting by top consumers, including man. (Auth.)

B-35731
Kock, K.-H., **Marine consumers: fish and squid,** *Environment international,* 1987 13(1), p.37-45, Refs. p.44-45.

Of about 20,000 modern fish species, only about 200 are found south of the Antarctic Convergence. The ichthyofauna is dominated by small species up to 40 cm long. The majority are bottom dwelling forms which belong mostly to the suborder Notothenioidei. More than 30 species of squid are so far known from the southern ocean. The majority are obviously meso-and bathy-pelagic dwellers. Several adaptations, including stenothermy, freezing resistance, aglomerular kidneys, and neutral buoyancy, enable antarctic coastal fish to live successfully in the harsh environment. Based on their food spectra fish species can roughly be divided into three groups: fish and krill feeders, plankton feeders, and benthos feeders. Fish, particularly mesopelagic fish, appear to be more important krill predators than squid. The role of squid as krill predators may have been overestimated in the past. Squid seem to be more important as a food resource for top level predators, particularly sperm whales and birds, than fish appear to be. Exploitation of antarctic finfish started at the end of the 1960s. The main fishing grounds are South Georgia and Kerguelen Is. (Auth. mod.)

B-35732
Gambell, R., **Whales in the antarctic ecosystem,** *Environment international,* 1987 13(1), p.47-54, Refs. p.53-54.

Direct biological evidence, supported by official catch data, suggests that there has been an approximate doubling in the pregnancy rates of blue and fin whales, dating from the time of the major depletions of these populations in the 1930s. Sei whales show a similar change from 1945, which predates the main reduction in the numbers of this species in the 1960s. Evidence from earplug age readings of fin whales, supported by direct analysis of catch samples, suggests that the age at sexual maturity has also declined, from around 10 to 6 years, since the 1930s. Smaller changes are indicated in sei and minke whales, again before direct exploitation. These changes imply that the whales are now growing faster than in earlier years, in addition to reproducing more frequently. This has been taken as evidence of a response by the reduced stocks having relatively more food. However, there is no evidence of increased recruitment, and doubts have been raised about the validity of the trends. Estimates have been made of the krill no longer consumed because of the reduced whale stocks, perhaps 147 million tonnes. But other members of the antarctic ecosystem, such as seals and birds, may be increasing as a result, and so it is unclear if the whales can recover even under full protection. (Auth. mod.)

B-35733
Croxall, J.P., **Status and conservation of antarctic seals and seabirds: a review,** *Environment international,* 1987 13(1), p.55-70, Refs. p.69-70.

Present threats to antarctic seabirds and seals when ashore include disturbance and habitat destruction (some directly caused by humans; most through the introduction of rabbits and other grazers; also seal damage to seabird habitats) and serious predation by introduced rats and cats at subantarctic islands. In the marine environment threats are posed by pesticides (widespread but at low levels), pollution (mainly a potential problem associated with oil exploration), incidental takes (trivial now, except perhaps for some albatrosses) and competition with commercial fisheries, which is reviewed in detail. Existing legislation offers excellent protection for wildlife, but formally protected aeas by no means cover the major breeding concentrations of seabirds and especially seals in all sectors and zones. Sensitive management of marine fisheries is difficult with the present level of quantitative data on predator-prey interactions (though this is better than in many other pelagic systems). Difficulties in monitoring aspects of predator biology as indices of the state of prey stocks are reviewed. (Auth. mod.)

B-35734
Gallardo, V.A., **Sublittoral macrofaunal benthos of the antarctic shelf,** *Environment international,* 1987 13(1), p.71-81, Refs. p.80-81.

A general review of the salient features of the sublittoral macrofaunal benthos of the antarctic shelf is presented. The need of recognizing a mixed epi-infauna biota, which includes an unusual epifaunal soft-bottom component, is suggested. This would help the study of the structure of the antarctic macrobenthos and lend some validity to future quantitative (density and biomass) distribution data. Sources of disturbance which may be important in structuring benthic communities in Antarctica are anchor ice, ice plucking, ice calving, mud slides, rafted clastic rain, and most important perhaps, iceberg ploughing. The antarctic benthic realm is unique because of its high taxonomic diversity, widespread endemism, and mostly K-adapted species; biomass is generally high and diverse suspension-feeding communities dominate. There are at present no effective means of establishing extensive protected marine areas or setting aside benthic reserves. (Auth. mod.)

B-35735
Walton, D.W.H., **Antarctic terrestrial ecosystem,** *Environment international,* 1987 13(1), p.83-93, Refs. p.92-93.

The maritime and continental antarctic terrestrial ecosystems are considered in the context of environmental impacts-habitat destruction, alien introductions, and pollution. Their ability to recover from perturbation is discussed in the light of present scientific knowledge, and the methods used to control impacts are reviewed. It is concluded that techniques of waste disposal are still inadequate, adequate training in environmental and conservation principles for antarctic personnel in many countries is lacking, and scientific investigations may be a much more serious threat than tourism to the integrity of these ecosystems. Some priorities crucial to future management are suggested. (Auth.)

B-35736
Smith, V.R., Lewis Smith, R.I., **Biota and conservation status of subantarctic islands,** *Environment international,* 1987 13(1), p.95-104, Refs. p.103-104.

Six islands or island groups (Marion, Prince Edward, Crozet, Kerguelen, Heard, McDonald, South Georgia and Macquarie) are considered in this account to belong to the subantarctic region. The environments and biota of these islands are described. The vulnera-

bility of their indigenous floras and faunas to introduced alien species is stressed. The sovereignty and administration of the islands and the conservation issues pertaining to them are discussed. Currently, less than 4% of the terrestrial subantarctic is under statutory protection. Conservation and protection of the subantarctic islands must be based on consideration of the conservation of the southern ocean as a whole.

B-35737

Angel, M.V., **Criteria for protected areas and other conservation measures in the antarctic region,** *Environment international,* 1987 13(1), p.105-114, Refs. p.113-114.

The antarctic region is threatened by 3 major anthropogenic influences: climatic change brought about by increases in atmospheric carbon dioxide, the effects of persistent pollutants carried into the region via atmosphere and ocean, and the increase in Man's activities. Vulnerable ecosystems can be considered as those which are under direct pressure from Man's activities, whereas fragile ecosystems are the more likely to suffer irreversible change when perturbed, but are not necessarily threatened at present. Three of the main habitat types, terrestrial, inland waters, and islands, are likely to be fragile. However, all these can be conserved reasonably adequately with a system of protected and managed areas, so long as the area covered is adequate and representative. The fourth habitat type, the oceanic ecosystem, contains few fragile elements because it is dominated by the highly dynamic physical oceanic processes. (Auth. mod.)

B-35738

Beddington, J.R., **Scientific requirements for the conservation of exploited living marine resources in the Antarctic,** *Environment international,* 1987 13(1), p.115-119, 27 refs.

Because of open access to marine living resources in the southern ocean it is in no individual's interest to practice restraint in harvesting when overexploitation by others continues. Thus, conservation of exploited species depends on a satisfactory political and management framework being established. The sustainable yields of exploited species can be modelled using simple models such as Schaefer's and variations on it, but such models are oversimplifications and their value for predicting sustainable yields is limited. It is likely that in the future some increased level of krill exploitation will occur. It will then be important to know, first: what is the potential yield of krill in various parts of the southern ocean? and, second: what is the critical density of krill for different species dependent on it? Research aimed at answering these questions is urgently needed. (Auth.)

B-35741

Bonner, W.N., Angel, M.V., **Conservation and the antarctic environment: the Working Group reports of the joint IUCN/SCAR Symposium on the Scientific Requirements for Antarctic Conservation,** *Environment international,* 1987 13(1), p.137-144, 1 ref.

Six working groups were set up at the joint IUCN/SCAR Symposium on the Scientific Requirements for Antarctic Conservation. These were charged with identifying gaps in the scientific understanding of ecosystems that inhibit rational management, and considering whether present conservation practices were taking enough account of what is known of the region, particularly with regard to protected areas. Recommendations include the following: there is still a need for synthesis and further work on stocks and the life history of krill in the pelagic ecosystem. Monitoring strategies are not clear and biomass determinations are difficult and costly. Information on squid is lacking. The network of existing protected areas is inadequate for preserving all species of birds, seals and whales; new criteria are needed for effective conservation. On land, the Agreed Measures provide an adequate framework for conservation, though additional steps are needed to ensure adherence to their provisions. Fish stocks are significantly exploited and better monitoring is required. Specially Protected Areas lack management plans and management plans at Sites of Special Scientific Interest are not consistent. There are inadequate guidelines on the development of scientific stations. The coastal region must be regarded as critical habitat. A comprehensive conservation strategy is required with a broader network of protected areas giving full consideration to marine as well as terrestrial areas. (Auth. mod.)

B-35744

Kawaguchi, K., Matsuda, O., Ishikawa, S., **Marine biological study carried out during the 25th Japanese Antarctic Research Expedition (1984/85) with special reference to the BIOMASS-oriented study,** *Antarctic record,* Mar. 1987 31(1), p.38-54, In Japanese with English summary. 6 refs.

The biological research group of the 25th JARE conducted studies on the dynamics of organic carbon, nitrogen and phosphorus cycles, and on the ecology of krill and fish under the coastal fast ice in Lützow-Holm Bay. Based on both field and laboratory experiments, new knowledge was obtained on the decomposition of particulate matter with special reference to the fate of carbon, nitrogen and phosphorus, and the ecology of notothenid fish, *Trematomus bernachii* and krill, *Euphausia superba* under the fast ice. Oceanographical observations, including standard samplings of phytoplankton and zooplankton, were made monthly at the 3 stations established during the 3-year program. Population censuses of Adélie penguins and Weddell seals were also included as part of the program. Besides the BIOMASS-oriented research, moss flora survey and and monitoring of lake waters, soil bacteria and algae were carried out. (Auth. mod.)

B-35746

Murayama, H., **Report of visual observations on penguins, seals and other seabird near Syowa Station, Antarctica, by the JARE-26 in 1985,** *Antarctic record,* Mar. 1987 31(1), p.67-76, In Japanese with English summary. 7 refs.

Visual observations on Weddell seals, Adélie penguins and other seabirds near Showa Station were carried out by the 26th JARE, as part of the environmental monitoring program. From Mar. 18 to 25, 300-500 Adélie penguins were observed. They were on their way to the north and in the course of molting. The first Adélie penguin was seen again on Oct. 21. Laid eggs were found on Nov. 16. The first hatching occurred on Dec. 23. Seven rookeries consisted of 2143 parents. Weddell seals were rarely seen from Apr. to Sep. On Mar. 25, 3 large groups comprising about 100 individuals were seen near Tottuki Point. From the end of Sep., many groups were often seen on the sea ice. The first pup was found on Oct. 10 near Ongulkalven I. From the end of Oct. to Nov., many newly born pups were seen at Rumpa I. The largest group consisted of 34 mothers and 26 pups. Forty to fifty Emperor penguins were seen on the sea ice from the end of Mar. to Apr. No individual was seen in winter and ten Emperor penguins were again seen on Oct. 23. The South Polar skuas disappeared in the middle of May and reappeared on Oct. 20. Maximum number was 23 individuals. Snow petrels, Cape pigeons and Wilson's storm petrels were also observed. (Auth.)

B-35752

Korovina, V.M., **Anatomical-histological peculiarities of the intestine of *Patagonotothen ramsayi* (Nototheniidae),** *Journal of ichthyology,* 1986 26(6), p.48-54, Translated from Voprosy ikhtiologii. 15 refs.

From specimens collected near the Falkland Is., the anatomy of the digestive tract, and the anatomical-histological peculiarities of the intestine, were studied in immature *Patagonotothen ramsayi.* Symptoms of primitive organization are expressed in the fine structure of

the intestine. The prerectal valve is located at the border of the midgut and hindgut. (Auth.)

B-35753

Efremenko, V.N., **Distribution of eggs and larvae of Myctophidae in the South Atlantic,** *Journal of ichthyology,* 1986 26(6), p.141-147, Translated from Voprosy ikhtiologii. Refs. p.145-147.

Data are reported on the distribution of eggs and larvae of 10 species of Myctophidae by depth, zoogeographical zone and in different seasons in the Southern Atlantic: *Krefftichthys anderssoni, Protomyctophum bolini, P. tenisoni, Electrona carlsbergi, E. antarctica, E. subaspera, Gymnoscopelus brauert, G. opisthopterus, G. nicholsi* and *G. fraseri.* The periods, depths and the spawning areas of the most common antarctic myctophids are established. (Auth.)

B-35755

Tveranger, B., **Effect of pigment content in broodstock diet on subsequent fertilization rate, survival and growth rate of rainbow trout *(Salmo gairdneri)* offspring,** *Aquaculture,* Apr. 15, 1986 53(2), p.85-93, 19 refs.

Rainbow trout were fed diets with 10% krill meal as source of pigmentation and diets without added pigments for an 8-month period until maturity. After stripping, egg batches of 3000-5000 eggs were incubated in darkness. Rainbow trout fry rich and poor in pigment ready for start-feeding were fed a carotenoid-free diet for 6 weeks. No statistically significant effects of pigmentation were found on rate of fertilization, survival of eggs and alevins or growth of fry during the start-feeding period. The mortality rates of eggs and alevins were positively correlated. (Auth.)

B-35760

Ward, B.L., Barrett, P.J., Vella, P., **Distribution and ecology of benthic foraminifera in McMurdo Sound, Antarctica,** *Palaeogeography, palaeoclimatology, palaeoecology,* Mar. 1987 58(3-4), p.139-153, 20 refs.

Foraminifera from modern sediments in McMurdo Sound have been studied to provide a basis for interpreting fossil assemblages there. Nearly 40,000 specimens of foraminifers (2334 living and 36,875 dead) were identified from 28 samples collected by gravity corer and grab from sites varying in depth between 79 and 856 m. Three present day assemblages can be recognized: shallow open water assemblages (SWA), dominated by calcareous species; deep open water assembalges (DWA), dominated by agglutinated species; and harbor assemblages (HA), dominated by agglutinated species. The composition of the assemblages is controlled chiefly by the calcium carbonate compensation depth (CCD). Comparison of McMurdo Sound assemblages to those from other areas of the Antarctic, the Arctic and the deep ocean indicates that there are gross similarities in the overall faunas. Death assemblages have a similar species diversity to corresponding life assemblages and are reasonably representative of them, except for open water assemblages from 620 (the CCD) to 420 m, where death assemblages are depleted in calcareous taxa. (Auth. mod.)

B-35761

Christie, P., **Nitrogen in two contrasting antarctic bryophyte communities,** *Journal of ecology,* Mar. 1987 75(1), p.73-93, Refs. p.91-93.

From Oct. 1978 until Feb. 1980, studies were conducted on the nitrogen inputs and outputs of two contrasting moss-dominated communities on Signy I.: a semi-ombrogenous dry turf and a soligenous wet carpet. The dry turf was more acidic than the wet carpet, had a lower water content than the wet carpet and lower concentrations per unit dry weight of total nitrogen, phosphorus and potassium. Accumulated winter snow overlying the dry turf and wet carpet in Oct. 1979 contained 39 and 42 microgram N/l, respectively. This snow melted and subsequent snow cover, which has accumulated 4 weeks later, contained 113 and 83 microgram N/l, respectively. These higher nitrogen concentrations were probably due to early summer activity by nearby penguins. Melt-water and pools on the surface of the sites in Dec. 1979 contained 230 and 165 microgram N/l on the dry turf and wet carpet, respectively. Numbers of sulphate-reducing bacteria *(Desulfovibrio* and *Desulfotomaculum)* and clostridia were very low, even in the wet carpet which contained 150 sulphate-reducers and 290 clostridia (100/g) dry wt peat. Cultures of the cyanobacterium *Nostoc muscorum* from both sites showed high acetylene reduction activity at 15 C. Calculated inorganic nitrogen inputs from biological nitrogen fixation and precipitation (including penguin activity) were 45.9 and 64.1 mg/sq m/year (dry turf) and 192.4 and 65.1 mg/sq m/year (wet carpet). (Auth. mod.)

B-35767

Cave, A.J.E., Bonner, W.N., **Facial asymmetry in a leopard seal *(Hydrurga leptonyx),*** *British Antarctic Survey. Bulletin,* May 1987 No.75, p.67-71, 7 refs.

A description is given of the first-time occurrence of facial asymmetry in the leopard seal *(Hydrurga leptonyx).* It is concluded that this resulted from a crushing injury in early life, possibly as a result of the subject being trapped between floating ice masses. (Auth.)

B-35777

Laws, R.M., Harris, R.M., **Seals and birds killed or captured in the Antarctic, 1975-85,** *Polar record,* May 1987 23(146), p.622-627, SCAR bulletin No.86, May 1987.

This analysis is based on statistics provided under Article XII of the Agreed Measures for the Conservation of Antarctic Fauna and Flora and the Conservation of Antarctic Seals. The returns of mammals and birds killed or captured in the Treaty Area, 1975-85, are summarized by year and by zone. Birds and seals captured and subsequently released are not included. In some cases the returns did not specify the area and in others the area overlapped two of the zones; these circumstances are shown in a table. There were no returns from Zone 6 alone. During the period 1975-85, an average of 299 seals were taken annually; this compares with 574 during the period 1964-1975. This is related to the phasing out of dog teams as a method of polar travel and a consequently reduced need to kill seals for dog food. Ninety-four percent were Weddell and crabeater seals, similar to the previous 11-year period. Over the same period, the annual average of 238 birds taken corresponds with the average of 230 in the previous 11 years. The average number of eggs reported, 73, is a considerable reduction on the 375 reported during the period 1964-75.

B-35846

Trivelpiece, W.Z., Trivelpiece, S.G., Volkman, N.J., **Ecological segregation of Adélie, Gentoo, and Chinstrap penguins at King George Island, Antarctica,** *Ecology,* Apr. 1987 68(2), p.351-361, 28 refs.

Ecological segregation among Adélie, Gentoo, and Chinstrap penguins during summer results from differences in breeding chronology, foraging behaviors, and life history tactics. To determine the importance of these factors in segregating the niches of the three species, data was collected on their population size, breeding success, breeding chronology, feeding frequency, and foraging range. Gentoo penguins feed inshore and are deep divers. Their small populations probably reflect the comparatively large amount of food they need to rear chicks and the small foraging range that is dictated by short nest relief schedules and nonfasting behaviors. Their deep diving ability enables them to exploit a niche that is unavailable to their more abundant congeners. Adélie and Chinstrap penguins are shallow-diving, offshore foragers that avoid competition by differences in breeding chronology, prebreeder behaviors, and molting strategies. Adélie chicks fledge just as Chinstrap chicks reach creche age. Different migration times and molting locations further reduce niche

overlap. No evidence was found to suggest that the niches of the *Pygoscelis* penguins were influenced by competition for food, and it is suggested that adaptation to conditions in the center of their respective distributions is the primary cause affecting ecological segregation in areas of sympatry. (Auth. mod.)

B-35851

Piatkowski, U., **Zoogeographical investigations and community analyses of antarctic macroplankton** [Zoogeographische Untersuchungen und Gemeinschaftsanalysen an antarktischem Makroplankton], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* 1987 No.34, 150p., In German with English summary. Refs. p.140-150.

A comprehensive presentation of geographical and vertical distribution of the summer antarctic macroplankton, as well as an analysis of its species composition and diversity, is given. The zoogeography of all prevailing species and main taxa is described for the waters off the Antarctic Peninsula and the Weddell Sea. The results are divided into 4 parts. Pt. 1 presents the geographic distribution and abundance of the macroplankton. A total of 90 different taxa could be identified. A large number of maps shows the distribution of the more abundant species. Pt. 2 shows values of catch volumina (ml/1000 cu m) for all stations, which are used to describe the distribution of macroplankton biomass in both regions. Biomass values at the Antarctic Peninsula are significantly higher than in the Weddell Sea. The values obtained are discussed and compared with those of recent literature. Pt. 3 describes the vertical distribution and migration patterns. In pt. 4, station and species communities are introduced by means of cluster analyses which characterize various faunal regions and species associations. (Auth. mod.)

B-35853

Duhamel, G., **Bothidae (Pisces: Pleuronectoidei) from Crozet Islands** [Les Bothidae (Pisces: Pleuronectoidei) des îles Crozet], *Cybium,* Dec. 1986 10(4), p.373-379, In French with English summary. 9 refs.

The oceanographic cruise MD 30 around the Crozet archipelago has allowed to identify 4 species of Bothidae among the 35 species collected in the beam trawls: *Mancopsetta maculata, Pseudomancopsetta andriashevi, Achiropsetta tricholepis* and *Neoachiropsetta milfordi.* Only one species, *M. maculata* has been collected before around the islands. Two of these new records had never been recorded in the southern ocean. (Auth.)

B-35855

Wood, A.M., Lande, R., Fryxell, G.A., **Quantitative genetic analysis of morphological variation in an antarctic diatom grown at two light intensities,** *Journal of phycology,* Mar. 1987 23(1), p.42-54, Refs. p.53-54.

Experiments with 10 clonal isolates of *Thalassiosira tumida,* made by single cell isolation from net hauls obtained at six stations in the marginal ice zone of the northeastern Antarctic during spring 1983, are described. This first quantitative genetic analysis of variation in diatom morphology supports the recognition of *T. tumida* in specific rank initially developed from morphological and biogeographical data. Most of the phenotypic variability in several taxonomically important characters was not genetic, and genotypes overlapped broadly in range of morphological variation.

B-35856

Boysen-Ennen, E., **Distribution of meso- and macrozooplankton in Weddell Sea surface water** [Zur Verbreitung des Meso- und Makrozooplanktons im Oberflächenwasser der Weddell See (Antarktis)], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* 1987 No.35, 126p., In German with English summary. Refs. p.112-125.

Zooplankton composition, abundance and diversity in the upper 300 m of the Weddell Sea during summer are described. The first part deals with the geographic distribution of the species and relates abundance to fishing depth, water depth, and water masses. A total of 83 species of epi- and mesopelagic copepods, ostracods, euphausiids, decapods, amphipods, mysids, siphonophores, gastropods, polychaets, chaetognaths and salps were found. Most of the species show a vertical maximum in the water layer between 200 and 50 m. The abundance of most species is highest in the oceanic Weddell Sea. The second part describes the zooplankton taken collectively. Making use of cluster analysis 3 distinct communities could be defined, coinciding in their geographical extension with the hydrographical "provinces": the southern shelf community, the northern meritic community, and the northern oceanic community. Species and trophic diversity is highest in the latter. (Auth. mod.)

B-35857

Reinke, M., **Feeding and locomotory physiology of *Salpa thompsoni* and *Salpa fusiformis*** [Zur Nahrungs- und Bewegungsphysiologie von *Salpa thompsoni* und *Salpa fusiformis*], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* 1987 No.36, 88p., Refs. p.80-84. In German with English summary.

Biometrics of *Salpa thompsoni* and motile behavior of *Salpa thompsoni* and *Salpa fusiformis* were investigated. All biometric parameters were highly correlated, resulting in a general conversion matrix. Low content of carbon (<10% of dry weight) and relation of ash free dry weight to ash (3:7) characterize the gelatinous plankton. Static thrust of tethered single blastozoids and oozoids was continuously analyzed with high resolution during a motile cycle. All individuals showed normal, escape and reverse swimming. Each motile cycle was divided into ingestion and egestion phases, both contributing to propulsion. Thrust of normal swimming increased with square of body length. Frequency patterns of movement were analyzed and volume of pumped water per hour was estimated. Movement was characterized by six distinct patterns. Volume of water pumped per hour increased with square of body length. The Mediterranean species *Salpa fusiformis* pumped more water per hour than the Antarctic species *Salpa thompsoni.* (Auth. mod.)

B-35860

Barrera Oro, E.R., Bellisio, C.E., **Technique for otolith inclusion in paraffin and its subsequent disection** [Técnica de inclusión de otolitos en parafina y su posterior seccionamiento], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.327, 12p., In Spanish with English summary.

The technique used at the Instituto Antártico Argentino for the interpretation of the growth rings in the sagittal otoliths of antarctic fishes is described. This technique comprises the stages of inclusion in paraffin mixture, cutting and subsequent clearance of the sections, similar to that used in the National Marine Fishery Service, Woods Hole, Massachusetts, with some modifications that have been introduced here. The method is to be used in marine or continental fishes whose otoliths are big (normally, no less than 3 mm) and calcified

enough to resist the cutting of the blades without breaking. Each step of this technique is shown graphically and described, as are the materials and equipment used. The advantages over the previous method of inclusion in translucent polyester resin are mentioned. (Auth. mod.)

B-35863

Comes, R., **Summer marine environmental parameters in West Antarctica** [Estudio de parámetros medioambientales marinos durante un ciclo estival en la Antártida occidental], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1986 No.326, 28p., In Spanish with English, French and German summaries. 10 refs.

Net phytoplankton production was determined, during the summer 1980-81 at 34 stations in a marine area along the Danco Coast, on the basis of 10 physico-chemical parameters analyzed for the integrated water column. Results are presented in a series of graphs and discussed.

B-35867

Perrin, R.A., Lü, P., Marchant, H.J., **Seasonal variation in marine phytoplankton and ice algae at a shallow antarctic coast site,** *Hydrobiologia,* Mar. 10, 1987 146(1), p.33-46, Refs. p.45-46.

The phytoplankton population near Davis, Vestfold Hills, was monitored throughout 1982. Chlorophyll-*a* determinations and counts of living cells in both the water column and sea ice demonstrated a marked seasonality in phytoplankton abundance and species composition. From Apr. to Oct. nanoplanktonic organisms contributed most of the chlorophyll-*a* in both the sea ice and water column. Blooms of diatoms occurred in May, Nov. and Dec. in the bottom of the sea-ice and in Jan. and Feb. in the water column. *Phaeocystis pouchetii* was dominant during Dec. in the water column. Large numbers of dead diatoms were found in winter. The concentrations of nitrate, dissolved inorganic phosphate and dissolved silicate increased throughout the year until Dec., when the concentrations of nitrate and silicate fell sharply, followed a month later by a reduction in phosphate concentration. The diversity of phytoplankton was greatest during the summer months. (Auth.)

B-35876

Usher, M.B., Edwards, M., **Selection of conservation areas in Antarctica: an example using the arthropod fauna of antarctic islands,** *Environmental conservation,* Summer 1986 13(2), p.115-122, 23 refs.

The aim of this paper is to investigate the terrestrial arthropod communities of 4 conservation sites in Antarctica, and to relate these communities to the 5 criteria of representativeness, uniqueness, type locality (a criteron not generally used in conservation studies), public appeal, and typicalness, respectively. The arthropod communities are compared with those on neighboring islands which have not been designated as conservationally important. The two criteria of representativeness and uniqueness are seen to be the most important for selecting national parks, or other conservation sites, in the Earth's wilderness areas.

B-35878

Brown, C.R., Klages, N.T., **Seasonal and annual variation in diets of Macaroni *(Eudyptes chrysolophus chrysolophus)* and southern rockhopper *(E. chrysocome chrysocome)* penguins at sub-Antarctic Marion Island,** *Journal of zoology,* May 1987 212(1), p.7-28, Refs. p.26-27.

The diets of adult Macaroni penguins *Eudyptes chrysolophus chrysolophus* and Rockhopper penguins *E. chrysocome chrysocome* were analyzed quantitatively at Marion I., throughout two successive chick-rearing seasons. The diets were broadly similar. Crustaceans were the predominant prey type comprising, overall, 90% by mass and 98% by numbers in Macaroni penguins and 96% by mass and 99% by numbers in Rockhopper penguins. *Nauticaris marionis* was the predominant crustacean eaten by both penguin species in 1983-84, but *Euphausia vallentini* and *Thysanoessa vicina* predominated in 1984-85. *Themisto gaudichaudii* was present in appreciable numbers only in Macaroni penguins. Fish was not found in measurable quantities in either species in 1983-84. In 1984-85, however, fish comprised 10% and 6% of observed mass and c. 25% and 14% of original biomass ingested in Macaroni and Rockhopper penguins, respectively. Cephalopods made up between 1% and 3% of the diet by mass in both penguin species and between 5% and 13% of original biomass ingested. Dietary segregation of the two species appears to be related to the difference in the timing of the breeding season, which begins three to four weeks earlier in Macaroni penguins. (Auth. mod.)

B-35879

Tedman, R., Green, B., **Water and sodium fluxes and lactational energetics in suckling pups of Weddell seals *(Leptonychotes weddelli)*,** *Journal of zoology,* May 1987 212(1), p.29-42, Refs. p.40-42.

Estimates of the water and sodium fluxes of unrestrained Weddell seal pups were derived from the turnover of tritiated water and 22sodium chloride throughout the nursing period. Milk intake was calculated from water influx. There was a strong correlation between daily body weight gain in pups and daily weight loss by dams. This considerable drain on the dams' energy reserves amounts to a loss of almost 60% of the female's body weight after parturition. Mean total body water of pups decreased from 72.5% at birth to 48.6% at day 40 of lactation. Total milk consumption was positively correlated with body weight gain by pups with daily milk intake ranging from 2.76 to 5.46 l/day. The pups gained 0.51 kg body weight for each litre of milk consumed, and the efficiency of conversion of milk energy to stored energy was 52.1%. Sodium influx rates averaged 2.24 mmol/kg/day. Approximately 70% of sodium intake was derived from milk, with the remainder coming from the ingestion of small amounts of sea water. The high energy content of the milk (20.8 MJ/kg) and reduced milk yield (relative to body weight) means that pups can consume sufficient energy for rapid growth with comparatively brief nursing periods and short lactational duration. (Auth. mod.)

B-35880

Adams, N.J., Klages, N.T., **Seasonal variation in the diet of the king penguin *(Aptenodytes patagonicus)* at sub-Antarctic Marion Island,** *Journal of zoology,* June 1987 212(2), p.303-324, Refs. p.319-321.

The diet of the king penguin *Aptenodytes patagonicus* at Marion I. was examined throughout the year by analysis of stomach samples. Fish accounted for 87% by wet mass, 75% by numbers and 69% by reconstituted mass. Their proportional importance by wet mass increased from 68% during winter to almost 100% in summer and probably reflects a real increase in their local availability. Squid comprised most of the remainder with crustaceans forming less than 1% of the diet by numbers. Prey items were generally small, the most abundant being three species of myctophid fish, *Krefftichthys anderssoni, Protomyctophum tenisoni* and *Electrona carlsbergi,* and a squid *Kondakovia longimana.* This is the first time that mesopelagic myctophid fish have been shown to comprise a major component of the diet of a vertebrate predator in the southern ocean. (Auth. mod.)

B-35884

Ni, C., **Study of heterotrophic microorganisms collected in Victoria Valley and Ross Island nearshore, Antarctica,** *Acta oceanologica Sinica (Hai yang hsueh pao),* 1986 8(6), p.736-742, In Chinese. 14 refs.

From Dec. 1981 to Feb. 1982, eight Chinese biologists participated in a research team organized by the New Zealand Government. The Chinese researchers collected various microorganisms including saccharomycetes, molds, and bacteria totalling 23 different types from 10 different areas in Victoria Valley and Ross Island nearshore. After returning to China, they isolated and identified 148 different strains. Among these strains: 47.1% were bacteria, 36.7% saccharomycetes, and 16.2% molds. The composition and growth temperatures for these microorganisms are also discussed.

B-35890

Dragonetti, J.P., **Krill freshness evaluation by objective and subjective methods** [Evaluación de la frescura del krill antártico *(Euphausia superba)* por métodos objetivos y subjetivos], *Montevideo. Instituto Antártico Uruguayo. Actividad científica, 1985/86,* Mar. 20, 1987 Vol.1, p.25-32, In Spanish with English summary. 30 refs.

Frozen krill samples were analyzed for total volatile nitrogenated bases values, the trimetil amina nitrogen values, and the trimetil amina values. An organoleptic inspection was also made. The methods used in the chemical evaluation here described are found to be suitable for an objective evaluation of krill. The organoleptic inspection leads to the conclusion that the samples never reached the ammoniacal-odor stage typical of altered fish products, maintaining a characteristic aromatic odor. Results are tabulated.

B-35891

Alvarez Cotelo, B.J., Fros Fros, T.A., Toyos Romay, M., **Eco-ethological variables in a rookery on Ardley Island** [Estudio de algunas variables eco-etológicas en una pingüinera de las islas Shetland del Sur, isla Ardley], *Montevideo. Instituto Antártico Uruguayo. Actividad científica, 1985/86,* Mar. 20, 1987 Vol.1, p.33-53, In Spanish with English summary. 23 refs.

An eco-ethological project with *Pigoscelis antarcticus* and *P. papua* penguins on Ardley I. is reported. Experiments with the following six variables at different stages of progress are described: penguins displaced from their higher density nesting areas; obstacles of progressive difficulty in their passage to the water; enclosures delimiting nesting areas; nests moved; population study by marking penguins with paint; determination of sex. It is concluded that man influences animal behavior, and the way man acts is fundamental. By graduating difficulties the rules or standards that will render possible the coexistence of animals and man can be established. (Auth. mod.)

B-35892

Grillo, B.A., **Study of plasma lipoproteins and their relation to atheriosclerosis in penguins** [Estudio de lipoproteínas plasmáticas y su relación con la aterosclerosis en el pingüino], *Montevideo. Instituto Antártico Uruguayo. Actividad científica, 1985/86,* Mar. 20, 1987 Vol.1, p.54-69, In Spanish with English summary. 44 refs.

Arteries and sera from 15 penguins captured at Artigas Station were studied. High levels of HDL low levels of LDL, and a high HDL-C/LDL-C ratio (3.5) were observed. This indicates metabolic protection to cholesterol accumulation in arterial walls. Lack of significant signs of atheriosclerosis is shown. The broad variability of VLDL levels found is supposed to be dependent on the particular avian metabolism and the condition of fasting at capture. Total serum lipids and lipoprotein lipids (separated by ultracentrifugation-flotation) show two fractions of E.C. not previously reported in birds, suggesting their possible relationship to penguin food in their wild habitat. (Auth. mod.)

B-35894

Testa, J.W., Siniff, D.B., **Population dynamics of Weddell seals *(Leptonychotes weddelli)* in McMurdo Sound, Antarctica,** *Ecological monographs,* June 1987 57(2), p.149-165, Refs. p.163-165.

Population dynamics of Weddell seals in McMurdo Sound were studied from 1970 to 1984 using mark-recapture estimation, aerial surveys, age structure and magnitude of harvests, and direct counts of pup production. Similar data from earlier studies were used to reconstruct the history of the population during the period of human presence after 1956. Jolly-Seber estimates of population size indicated a general decline from 1970 to 1976, low numbers in 1976 and 1978, and relative stability from 1979 to 1984 at apprx. 1500 adult seals. From 1970 to 1983, mean annual survival of adult female and male Weddell seals was estimated at 0.85 and 0.76. Counts made in aerial surveys in the summers of 1982/1983 and 1983/1984 were substantially below similar survey/counts in the 1960s. Pup production in the breeding colonies also declined from 1967 to 1976, but has recovered and been stable since 1979. Collections spanning 28 yr indicated significant shifts in age structure characteristic of populations undergoing a rapid increase and then decline. The population declined to low levels in 1976-1978 and has been fairly stable since 1979, probably at a level lower than before harvesting began. Survival and reproductive parameters of these Weddell seals are low relative to other pinnipeds, suggesting that the adult population is at an equilibrium with its environment. (Auth. mod.)

B-35922

Norman, F.I., **Ducks of Macquarie Island,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Feb. 1987 No.42, 22p., Refs. p.20-22.

Early references to waterfowl on Macquarie I. and observations made by ANARE expeditioners between 1949 and 1985 are reviewed and discussed. Apart from a unique (perhaps erroneous) record of a mute swan *Cygnus olor,* information is restricted to the Pacific black duck *Anas superciliosa,* the grey teal *A. gibberifrons* and the alien mallard *A. platyrhynchos* and its hybrids. Records of breeding (eggs, ducklings and nests) for black duck suggest that laying begins in Sep. and extends, at least, into Jan. Zooplankton is most abundant in spring and summer, but ducks may obtain high protein foods from the littoral and sublittoral areas and may also take seeds of terrestrial plants. The intrusion of mallards onto the island and the resultant hybridization with black duck poses a threat for the future integrity of the latter native species. (Auth. mod.)

B-35927

Franzmann, P.D., Cameron, D.E., McMeekin, T.A., Burton, H.R., **Australian Collection of Antarctic Microorganisms: a catalogue of strains, 1987,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.47, 20p., 9 refs.

Details of the Australian Collection of Antarctic Microorganisms, housed at the University of Tasmania, are presented, including a catalogue of ninety-eight strains isolated from the antarctic continent, subantarctic islands and the southern ocean. (Auth.)

B-35928

Gales, R.P., **Validation of the stomach-flushing technique for obtaining stomach contents of penguins,** *Ibis,* July 1987 129(3), p.335-343, 18 refs.

The efficiency of the stomach flushing technique in obtaining stomach contents was tested on Little, Gentoo and Rockhopper Penguins. This technique was validated by feeding the penguins known amounts of fish and subsequently flushing their stomachs after specified time intervals. Examination of the contents showed that the method is effective and offers an alternative to killing penguins in

order to obtain stomach contents. The effects of different states of stomach fullness on food recovery rates highlighted the necessity for multiple flushing. Quantitative information on the effect of time between feeding and stomach flushing on the recovery rates was also obtained. Where stomach contents were relatively undigested the rate of retrieval of fish was 90-100%, but this rate decreased with time and in no cases in which stomach contents were in advanced stages of digestion was the retrieval rate higher than 80%. Inclusion of the Gentoo and Rockhopper Penguins in the validation trials showed that penguin size does not affect recovery rate. (Auth.)

B-35930

Burckle, L.H., **Diatom distribution in the Weddell Gyre region during late winter,** *Micropaleontology,* June 1987 33(2), p.177-184, 37 refs.

Diatoms from the water column and sea-ice were analyzed in a late austral winter data set collected from the Soviet icebreaker *Mikhail Somov* in October-November 1981 in the Weddell Gyre region. Two major diatom assemblages are apparent in the water column and have distribution patterns that are influenced by surface and near-surface water hydrography. An assemblage dominated by *Nitzschia kerguelensis* is associated with typical Weddell Deep Water (WDW), while most warm-water cells within the WDW are associated with an assemblage dominated by *Thalassiothrix antarctica.* Sea-ice cores usually contain a surface assemblage dominated by *Cylindrotheca closterium,* a neritic form, underlain by *N. kerguelensis*- and *T. antarctica*-dominated assemblages. The diatom stratigraphy in these cores and the nature of the assemblages suggests that the surface form, *C. closterium,* has grown in place while the *N. kerguelensis*- and *T. antarctica*- dominated assemblages were frozen into the ice. It is hypothesized that, as the winter progressed, these latter two assemblages were sequentially frozen into sea-ice, thus leaving a record of gross oceanographic changes that occurred in surface waters beneath the ice during the austral winter. (Auth. mod.)

B-35982

Mehlum, F., Rahn, H., Bech, C., Haftorn, S., **Interrelationships between egg dimensions, pore numbers, incubation time, and adult body mass in Procellariiformes with special reference to the antarctic petrel *Thalassoica antarctica*,** *Polar research,* June 1987 5(1), p.53-58, 20 refs.

Dimensions of eggs and eggshells and pore density are reported for eggs of the antarctic petrel (as well as eggs of the Snow Petrel). Allometric relationships are used to estimate the initial egg mass, total number of pores and incubation time. The initial egg mass for antarctic petrel was estimated to 83 g, and the incubation time to 55 days. The total pore number in antarctic petrel was estimated to 4212 and in Snow Petrel 2654 pores per egg. Using data from 8 species of Procellariiformes, the relationship between total pore counts, initial egg mass and incubation time is described. (Auth.)

B-35983

Zapol, W.M., **Diving adaptations of the Weddell Seal,** *Scientific American,* June 1987 256(6), p.100-105, 4 refs. (p.136).

Laboratory and field studies of the diving physiology of Weddell seals are reviewed, including the author's own field observations in McMurdo Sound. Collapsible lungs and fresh supply of red blood cells during dives, probably by the spleen, are found to be major features in the seals' diving process.

B-35984

Top, Z., Wharton, R.A., Jr., McKay, C.P., **Comment on "Oxygen budget of a perennially ice-covered antarctic lake [and Reply],** *Limnology and oceanography,* Mar. 1987 32(2), p.520-521, 5 refs. For article being discussed see 40-4358 or B-34125.

Top questions the Wharton/McKay assumption that all of the O2 content of the meltwater joining the lake each year is retained by the lake. Wharton/McKay point out that since the lake freezing rate is too low for O2 bubbles to form, they did not expect a significant amount of the gas to be retained by the lake. They also suggest that arctic ice edge freezing rates do not apply to antarctic lakes.

B-36009

Nelson, D.M., Smith, W.O., Jr., Gordon, L.I., Huber, B.A., **Spring distributions of density, nutrients, and phytoplankton biomass in the ice edge zone of the Weddell-Scotia Sea,** *Journal of geophysical research,* June 30, 1987 92(C7), p.7181-7190, 28 refs.

Data was collected on temperature, salinity, nutrient concentrations (nitrate, nitrite, phosphate, and silicic acid), and phytoplankton biomass (chlorophyll *a,* particulate carbon, nitrogen, and biogenic silica) in the upper 150 m in the marginal ice zone of the eastern Scotia Sea and northwestern Weddell Sea during Nov. and early Dec. of 1983. A distinct hydrographic front separating Drake Passage water from Weddell and Scotia sea surface waters was located at approximately 59 S and was the site of a consistent maximum in phytoplankton biomass. In addition, there was a pronounced phytoplankton biomass maximum associated with a surface salinity minimum near the northern limit of pack ice in the waters of the Weddell-Scotia confluence that characterized the western portion of the study area. In the eastern half of the study area, characterized by largely unmodified Weddell Sea surface water, the phytoplankton biomass near the ice edge was 2-5 times lower than that in the Weddell-Scotia confluence but was increasing with time. The water column structure, nutrient fields, and phytoplankton biomass distributon all suggest that the high phytoplankton biomass in the ice edge zone of the Weddell-Scotia confluence and the lower but temporally increasing biomass near the ice edge in unmodified Weddell Sea water reflect ice edge phytoplankton blooms in different stages of their seasonal development. A bloom had become well established in the waters of the Weddell-Scotia confluence by mid-Nov., but the ice-free, vertically stable near-surface water column necessary for enhanced phytoplankton growth had apparently not been present long enough for high biomass levels to develop within the Weddell Sea proper. (Auth.)

B-36011

Jiang, J., Xu, Z., **Study of epiphytic diatoms in Newcomb Bay, Antarctica,** *Acta oceanologica Sinica (Hai yang hsueh pao),* 1983 5(6), p.783-788, In Chinese. 11 refs.

In Jan. 1980, Chinese researchers made a first visit to Antarctica. During this trip they collected samples of algae in the Newcomb Bay area. After examination of these samples, it was discovered that many epiphytic diatoms, of different structure, form and size, live on the fronds and bases of seaweeds. Their ultrastructure was analyzed by electron microscope. Among the 27 species collected and examined, the predominant species were Cocconeis, Licmophora, and Campylosira.

B-36015

Ingle, R.W., Garrod, C., **Ornamentation changes associated with growth of Falkland Island populations of *Paralomis granulosa* (Jacquinot, 1842-1847) (Decapoda, Lithodidae),** *Crustaceana,* Mar. 1987 52(2), p.220-224, 17 refs.

Falkland Island populations of *Paralomis granulosa* were investigated to assess their commercial potential. This study provided a suitable series of specimens for detailed examination of the changes in surface ornamentation which occur as the crab increases in size. Four female specimens of carapace lengths 19, 38, 50 and 60 mm were chosen to illustrate these changes; all were collected at a depth of 20

to 30 m in Fox Bay, Falkland Islands. Descriptions are given of the ornamentation investing the dorsal surface of the carapace, abdomen, and outer surfaces of the limbs. (Auth.)

B-36019

Burcham, T.S., **Purification and primary sequences of the major Arginine-containing antifreeze glycopeptides from the fish *Eleginus gracilis*,** *Journal of biological chemistry,* May 15, 1986 261(14), p.6384-6386, 44 refs. With unpublished supplement, n.p.

An Arg-containing antifreeze glycoprotein from the polar fish *Eleginus gracilis* was isolated, and the major components were purified to homogeneity. DEAE-cellulose chromatography resulted in two fractions, A and B. Fraction A contained most of the antifreeze glycoprotein found in *E. gracilis* (80% by weight) and consisted of 13 distinct components. Unlike antifreeze glycoproteins from other previously studied polar fish, Fraction A contained both low and high molecular weight antifreeze glycoprotein components. The two major components of fraction A were sequenced and compared with the sequence of antifreeze glycoproteins 7 and 8 from both *Boreogadus saida* and *Pagothenia borchgrevinki.* The antifreeze glycoproteins from *E. gracilis* were shown to have a similar composition to those previously studied, except for an additional Ala-Arg dipeptide at the carbon terminal in the major components of Fraction A and the position of Pro in the low molecular weight components. (Auth.)

B-36037

Clarke, A., **Report of the BIOMASS workshop on krill physiology, Rimouski, Quebec, 15-17 Sep. 1986,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* June 1987 No.51, 19p.

The major points to emerge from the workshop were: it is premature to attempt the construction of a full-scale energy budget in krill; krill have the potential to grow and reach sexual maturity in 12-18 months; krill regress to an immature-like stage during winter; krill can utilize copepods as food, and under-ice feeding is an important aspect of krill biology; in some areas, such as Bransfield Strait, the spawning season is extended and female fecundity higher; krill filtration rates are greater than previously estimated; there are extensive differences between krill in adjacent swarms, and moulting is not synchronous within a swarm; and care needs to be used in the measurement of soluble age-pigment content in krill. Age-pigment analyses will be valuable in validating and calibrating morphometric techniques for aging krill quickly and efficiently.

B-36038

BIOMASS Data Centre Advisory Group, **Meeting of BIOMASS Data Centre Advisory Group, Bremerhaven, F.R.G., 28-30 October 1986,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* Apr. 1987 No.49, 22p.

The following was discussed at the meeting: data access policies and the reactions of the BIOMASS community, with a new set of guidelines agreed upon which are presented in a table; performance of the Data Centre following the experience of the Ichthyoplankton Workshop, with the conclusion that the Workshop had been very successful, especially for demonstrating how much time is needed for validation; future workshop timetable, with the Group's recognition of a need for a workshop to consider the distribution of krill with respect to time; data exchange with other international Data Centres (IOC/I-OCE); receipt of SIBEX data, data quality and analysis requirements, with a table showing the current availability of SIBEX data in the database; and communication between Group members and the BIOMASS community, with a table showing approximate costs of network usage between various countries and the United Kingdom. The contents of documentation for BIOMASS Data Centre are listed. The decision was made to arrange the next meeting of the Data Centre Advisory Group after completion of the Oceanographic Workshop and after the Executive had addressed the points raised by the current meeting.

B-36043

Tearle, P.V., **Cryptogamic carbohydrate release and microbial response during spring freeze-thaw cycles in antarctic fellfield fines,** *Soil biology and biochemistry,* 1987 19(4), p.381-390, 26 refs.

The soluble carbohydrate and polyhydric alcohol (polyol) content of fruticose lichens, cushion mosses and early vegetative colonizers of maritime antarctic fellfield soils were examined by gas-liquid chromatography during 18 months. The total sugar plus polyol content in lichens varied significantly with season, ranging from 62 to 236 mg/g dry wt. Although such total seasonal changes were not significant in a cushion moss, its polyol concentration increased from 4.0 to 37.0 mg/g dry wt. The major polyol present in the cryptogams was arabitol reaching 115.4 mg/g dry wt, equivalent to 71% of the total sugars plus polyols. The amounts of polyols found in antarctic lichens were up to 3 times those reported in temperate lichens, providing considerable potential for frost tolerance. The soluble sugars and polyols leached into fellfield soil fines from the surrounding vegetation were quantified during the spring. These were sometimes in excess of 1% fresh wt and were compared with the composition and population size of the bacterial, yeast, fungal and algal microflora. Significant relationships were found between the algal and bacterial populations in conjunction with the water content of the fines. The implications of large amounts of sugar within the fines and the possible consequences for microbial and cryptogamic colonization are discussed. (Auth.)

B-36047

Croxall, J.P., ed, **Seabirds: feeding ecology and role in marine ecosystems,** Cambridge University Press, 1987, 408p., Papers presented at the 28th International Ornithological Congress, 1986, Symposium on Seabirds and Nutrient Cycles. For selected papers see B-36048 through B-36051.

DLC QL698.3.S4 1987

Understanding predator-prey relationships requires much information about the diet, distribution and bioenergetics of both predators and prey and on the detailed nature of their interactions. A number of major studies have recently been undertaken to assess the role of top predators, especially seabirds, as consumers to productive marine systems. This book presents results from a selection of these studies. Most of this book—and especially the reviews of feeding ecology—is concerned with 4 seabird groups: penguins (Sphenisciformes); albatrosses, petrels, storm petrels and diving petrels (Procellariiformes); pelicans, gannets and boobies, frigatebirds, tropicbirds and cormorants (Pelecaniformes); and auks, or alcids (Alcidae). This assemblage totals nearly 200 species. The volume seeks to deal with the nature of seabird diets, when and how they catch prey and, in respect of the case-studies, where these activities are concentrated, at least at certain times of the year. The early chapters of this book review the characteristics of the marine environment, seabirds' adaptations and abilities for flight, and diving, and their adaptations for feeding at sea. (Auth. mod.)

B-36048

Kooyman, G.L., Davis, R.W., **Diving behavior and performance, with special reference to penguins,** Seabirds: feeding ecology and role in marine ecosystems, edited by J.P. Croxall, Cambridge University Press, 1987, p.63-75, 31 refs.

DLC QL698.3.S4 1987

There have been few studies of the diving behavior or swimming performance of seabirds and data for some species are available only from laboratory experiments. This is partly because the present dive-recording instruments are too large for the small size of most aquatic

birds. The recent development of small and cheap velocity recorders and depth recorders may, however, substantially improve the situation. The main features of aquatic behavior and performance relate to dive depth and duration and swimming speeds. These are influenced by hydrodynamic properties, body oxygen stores and metabolic rates. What is known on these topics is reviewed. Most work has been done on penguins, but comparisons with other aquatic birds is made where information is available. (Auth.)

B-36049

Croxall, J.P., Lishman, G.S., **Food and feeding ecology of penguins,** Seabirds: feeding ecology and role in marine ecosystems, edited by J.P. Croxall, Cambridge University Press, 1987, p.101-133, Refs. p.127-131.

DLC QL698.3.S4 1987

About 17 species of penguins are found in cool and coldwater systems of the Southern Hemisphere with the greatest concentrations being found at sub-antarctic islands and on the antarctic continent. Penguins have a natural and adaptive morphology which enables them to function better than most other birds in a cold marine environment: wings have become stiff, flexible paddles powered by highly developed breast muscles; the body is nearly as dense as the water which facilitates diving; and the feet extending well to the rear act with the tail as rudders. Various aspects of their diets and feeding behavior are reviewed. Diets include crustaceans, fish and cephalopods in a number of variations such as intraspecific, availability, seasonal, and annual. Behavioral factors include diving depth and duration; foraging range and success during breeding seasons; and feeding ecology and ecological segregation.

B-36050

Prince, P.A., Morgan, R.A., **Diet and feeding ecology of *Procellariiformes*,** Seabirds: feeding ecology and role in marine ecosystems, edited by J.P. Croxall, Cambridge University Press, 1987, p.135-171, Refs. p.164-171.

DLC QL698.3.S4 1987

The *Procellariiformes* comprise 14 species of albatross, 65 of petrels and shearwaters, 20 of storm petrels, and 4 of diving petrels. Feeding behavior of selected species at South Georgia and other subantarctic islands is reviewed in terms of live prey taken, carrion consumed, preferred prey, numbers of cephalopod beaks found, surface *vs* in-flight feeding, competition for prey, dietary differences during breeding-rearing *vs* non-breeding-non-rearing periods, foraging grounds, feeding methods, nighttime *vs* daytime feeding, and environmental conditions. Some *Procellariiformes* data are also included from Australia, New Zealand, and some Northern Hemisphere marine environments.

B-36051

Croxall, J.P., Prince, P.A., **Seabirds as predators on marine resources, especially krill, at South Georgia,** Seabirds: feeding ecology and role in marine ecosystems, edited by J.P. Croxall, Cambridge University Press, 1987, p.347-368, 34 refs.

DLC QL698.3.S4 1987

Following a description of the physical environment of South Georgia, its surrounding waters, and its permanent and transient avian population, relationships are reviewed between the birds and the sea animals upon which they subsist. Topics reviewed include: prey consumption in which it is concluded that breeding birds of all species with a total biomass of 32,846 tonnes, consume 7.8 million tonnes of prey annually of which 73% are krill, 13% copepods, 6% squid, 5% fish, and 3% amphipods; predator-prey interactions, particularly krill, fish, and squid; ecological isolating mechanisms in which temporal, dietary, and geographical factors are dominant considerations. Lack of a large body of specific information in several important aspects of these relationships prevents making explicit quantitative conclusions on the role of seabirds in the food web.

B-36099

Davies, L., **Long adult life, low reproduction and competition in two subantarctic carabid beetles,** *Ecological entomology,* May 1987 12(2), p.149-162, 22 refs.

On the biologically impoverished sub-Antarctic Ile de la Possession, Iles Crozet, *Amblystogenium pacificum* Putzeys and *A. minimum* Luff (Carabidae), both opportunistic carnivores, coexist in fellfield habitat above 120 m altitude, where they hunt prey in inter-stone spaces. Beetles show marked claw wear showing that many individuals survive to breed in their third or later year of adult life, and in some years, particularly in *A. minimum,* populations consisted largely of very old beetles. This coupled with evidence from ripe egg numbers, of rarity of tenerals and of larvae, shows that adult recruitment rates were usually very low. In fellfield the coexisting species pair have non-overlapping size distributions with *A. pacificum* the larger. In moorland *A. pacificum* adults occur in isolation and are smaller and overlap the size ranges of both species in fellfield. These facts are interpreted as character displacement or release, reflecting present-day interspecific competition, probably for food. Supporting evidence was obtained in terms of apparent size-differential survival of beetles of different ages. (Auth.)

B-36100

Campbell, D., Hellgren, L., Karlstam, B., Vincent, J., **Debriding ability of a novel multi-enzyme preparation isolated from antarctic krill *(Euphausia superba)*,** *Experientia,* May 15, 1987 43(5), p.578-579, 8 refs.

The wound-debriding activity of various types of proteolytic enzymes and proteases from antarctic krill (multi-enzyme system consisting of both endo- and exopeptidases) was evaluated. The results, based on the enzymatically achieved weight reduction of a necrotic animal material (excised rat skin) in vitro, clearly showed that the multi-enzyme system (krill) had a higher degrading activity than the single enzyme preparation, or that with only a few enzymes. The debriding effect of the krill enzymes was markedly related to the enzyme concentration, resulting in 70-100% substrate degradation after 24 h. The digesting capacity of trypsin reached about 50%, but an increase in concentration of this enzyme did not substantially influence its overall activity. The effect of streptokinase-streptodornase, collagenase and plasmin-desoxyribonuclease was weak (10-20% digested). (Auth.)

B-36104

Kappen, L., Redon, J., **Photosynthesis and water relations of three maritime antarctic lichen species,** *Flora,* 1987 179(3), p.215-229, 19 refs.

Habitat conditions, photosynthesis and water relations of three prominent lichen species *(Ramalina terebrata, Usnea faciata, Himantormia lugubris)* from the maritime Antarctic were investigated. The ornithocoprophilous *R. terebrata* had the highest photosynthetic productivity, and water absorption capacity. The two growth forms of *U. fasciata* although occurring at the same habitat differed widely in their potential net photosynthesis. It is hypothesized that the prostrate growth form is degenerated as a result of competition with bryophytes. *Himantormia lugubris* had a very low potential photosynthesis. All lichens were capable of absorbing water from a saturated atmosphere. Net photosynthesis was depressed by high thallus water contents only at high temperatures which generally do not occur in their natural environment. Rainwater-soaked thalli remained generally below 8 C under natural conditions. (Auth. mod.)

B-36108
Soyer, J., Thiriot-Quievreux, C., Colomines, J.C., **Description of two sibling species of the *Tigriopus angulatus* group (Copepoda, Harpacticoida) from the Crozet and Kerguelen Islands (French Austral and Antarctic Territory)** [Description de deux espèces jumelles du groupe *Tigriopus angulatus* (Copepoda, Harpacticoida) dans les archipels Crozet et Kerguelen (Terres Australes et Antarctiques Françaises)], *Zoologica scripta,* 1987 16(2), p.143-154, In French with English summary. Refs. p.153-154.

Large populations of *Tigriopus* are reported from the Kerguelen and Crozet Is. The two populations exhibit complete sexual isolation, strong genetic differentiation and different karyological patterns. The description of these two new species points out only very slight morphological differences and they may be considered as sibling species. Distribution and status of the 9 known species of *Tigriopus* are discussed. (Auth.)

B-36109
Jumeau, P.J.A.M., Usher, M.B., **Antarctic predatory mite *Gamasellus racovitzai* Trouessart (Mesostigmata): a morphometric study of two subspecies,** *Acarologia,* Mar. 1987 28(1), p.15-26, 21 refs.

Fifty-seven morphological characters were scored on a sample of 46 male and 55 characters on a sample of 40 female *Gamasellus racovitzai,* which had been collected from 10 localities in the maritime Antarctic. A lectotype of *G. racovitzai,* selected from the collection studied by Trouessart, is designated. The same morphological characters have been scored for the lectotype and for the holotype of *G. r. neo-orcadensis.* Principal co-ordinates analysis indicates that there is a morphological separation between specimens of *G. racovitzai* from the South Orkney Is. and from elsewhere in the maritime Antarctic. It is concluded that two subspecies of *G. racovitzai* should be recognized. The nominate subspecies is distributed along the Antarctic Peninsula, its offshore islands, and the South Shetland Is., whilst subspecies *neo-orcadensis* is restricted to the South Orkney Is. *G. r. neo-orcadensis* is redefined. (Auth.)

B-36110
Tuovila, B.J., LaRock, P.A., **Occurrence and preservation of ATP in antarctic rocks and its implications in biomass determinations,** *Geomicrobiology journal,* 1987 5(2), p.105-118, 13 refs.

The low temperature and moisture availability in antarctic rocks would seem to preclude the existence of any sizeable algal biomass. The very high levels of ATP associated with endolithic algal communities have led to speculation that the measured ATP largely represents accumulated exogenous material as well as living biomass. A method was developed to selectively hydrolyze free, extracellular ATP without affecting intracellular ATP. Use of this technique on antarctic rock samples has led to the conclusion that the ATP found in endolithic communities exclusively reflects living material and not preserved, free ATP. From these measurements it is concluded that the ATP biomass in a gram of rock is equivalent to that found in more temperate and favorable environments. (Auth.)

B-36112
Ikeda, T., **Mature antarctic krill *(Euphausia superba* Dana) grown from eggs in the laboratory,** *Journal of plankton research,* May 1987 9(3), p.565-569, 18 refs.

Fertilized eggs obtained from female krill in antarctic waters were transported to the Australian Antarctic Division in Tasmania. The eggs were successfully developed to larval, juvenile, subadult and finally mature adult stages in the laboratory. Under experimental conditions of unlimited food supply, at 0 C and in complete darkness, the length of the life cycle from egg to egg was 3 years. (Auth.)

B-36113
Cannon, R.J.C., **Effects of low-temperature acclimation on the survival and cold tolerance of an antarctic mite,** *Journal of insect physiology,* 1987 33(7), p.509-521, Refs. p.520-521.

The effects of long-term exposures to constant temperatures (+4, 0, -5, -10, -15 and -20 C) on the survival of a cryptostigmatid mite, *Alaskozetes antarcticus,* were studied during 1983-4 on Signy I. Field-fresh samples collected during the austral summer showed very large (e.g. about 60 percentage points) variations in survival when placed at constant temperatures. For twelve summer samples, survival after 24 h at -15 C was highly correlated with supercooling capacity. Winter samples showed little variation in survival, in terms of collection-date. Percentage survival remained greater than 85% at -5, -10 and -15 C, for exposures up to 100 days. Samples with median supercooling points of about -30 C showed 52% survival after 250 days at -15 C, and 73% survival after 100 days at -20 C. Survival ability under controlled laboratory conditions appeared to exceed the requirements of average winter-habitat temperatures, but the effects of fluctuating and extreme temperatures require investigation. Supercooling points are considered to be accurate indicators of low-temperature survival capability in this species. (Auth. mod.)

B-36114
Mitchell, J.G., Silver, M.W., **Archaeomonad (Chrysophyta) cysts: ecological and paleoecological significance,** *Bio systems,* 1986 19(4), p.289-298, Refs. p.297-298.

Archaeomonads are chrysophyte cysts abundant in Weddell Sea ice, but they form in the water column in response to conditions that occur in areas where no sea ice is present. The association between archaeomonads and sea ice depends on a particular sequence of oceanographic conditions, beginning with lateral advection followed by vertical harvesting on rising ice crystals. Comparing fossil and modern distributions suggests archaeomonads underwent an ecological transition or expansion in the Early Tertiary Period, from sediment underlying anoxic waters to sediments underlying sea ice. (Auth.)

B-36115
Marin, V., **Oceanographic structure of the eastern Scotia Sea. 4. Distribution of copepod species in relation to hydrography in 1981,** *Deep-sea research,* Jan. 1987 34(1A), p.105-121, 38 refs.

The boundary region where the Antarctic Circumpolar Current contacts the Weddell Sea Water represents an ecological barrier that affects the absolute abundances and developmental stage structure of the population of copepods in the area. This boundary is suggested as the southern limit of *Calanus simillimus* and *Clausocalanus laticeps.* However, it does not separate two distinct communities since the order of abundance of species does not differ significantly between sides of the boundary. (Auth.)

B-36117
Davenport, J., Blackstock, N., Davies, D.A., Yarrington, M., **Observations on the physiology and integumentary structure of the antarctic pycnogonid *Decolopoda australis*,** *Journal of zoology,* Mar. 1987 211(3), p.451-465, 20 refs.

The giant antarctic pycnogonid *Decolopoda australis* Eights takes up oxygen by diffusion across the integument, particularly of the legs. The circulatory system is feeble and haemolymph pressure changes are induced by leg movements during locomotion rather than by cardiac action. Heart rate is about 30-40 beats/min between 1 and 5 C; it becomes irregular above 5 C and ceases (reversibly) at 6-7 C. The integumentary structure appears to facilitate gaseous exchange. Although the cuticle is chitinous, it is perforated by circular/ellipsoi-

dal tissue-filled pits which are separated from the external environment by thin layers of chitinous cuticle. The pits occur in all parts of the body and appendages (except arthrodial membranes). It is suggested that the primary function of the tissue within the pits is to form a route for gaseous diffusion. (Auth. mod.)

B-36118

Sorokina, T.A., Abyzov, S.S., **Pseudomonas bacteria from an antarctic glacial ice sheet,** *Akademiia nauk SSSR. Izvestiya. Biology bulletin,* July-Aug. 1986 (pub. May 87) 13(4), p.288-297, For Russian original see 41-1824 or 15B-34889. Refs. p.294-297.

Five strains of bacteria of the genus *Pseudomonas* were isolated from the ice sheet of a glacier near Vostok Station. Three of these were found at a depth of 79-81 m, and two at 91-92 m. The approximate age of these ice levels is 2100 and 2500 years, respectively. The strains differ in growth temperature, which may indicate differences in their origin. The distinctive trait of the bacteria is their ability to produce brown melanin-like pigment in addition to green fluorescing pigment. According to the array of phenotypic traits, the cultures are close to the species *P. putida* and *P. aeruginosa.* A basic characterization of the *Pseudomonas* bacteria isolated from the ice sheet is given, and possibilities of how they might have been introduced into the glacier are discussed. (Auth.)

B-36119

Wägele, H., **Redescription and anatomy of *Aegires (Anaegires) albus* Thiele, 1912 (Opisthobranchia, Doridacea) and synonymy with *A. protectus* Odhner, 1934,** *Polar biology,* 1987 7(5), p.267-272, 7 refs.

Rich material from the Weddell Sea allows a detailed description of the morphology and anatomy of *Aegires albus* Thiele, 1912, an antarctic nudibranch. Comparison of the holotypes of *A. albus* and *A. protectus* Odhner, 1934, the other *Aegires* from the Antarctic with the present material shows that these two species are synonymous. (Auth.)

B-36120

Friedmann, E.I., McKay, C.P., Nienow, J.A., **Cryptoendolithic microbial environment in the Ross desert of Antarctica: satellite-transmitted continuous nanoclimate data, 1984 to 1986,** *Polar biology,* 1987 7(5), p.273-287, 28 refs.

A satellite mediated station for monitoring nanoclimate (climate in the millimeter range) data, suitable for use in polar regions is described. The station, located in the Ross desert of Antarctica, has been in operation for more than 3 years, measuring rock temperatures, air temperature, light, snow, wind, and moisture. The data indicate that biological activity in the cryptoendolithic microbial ecosystem is limited to the period from mid Nov. to mid Feb. The total number of hours of biological activity, based on assumptions of the minimum light, temperature and moisture requirements of the community, is less than 1000 h/year. The time above 0 C, representing more nearly optimal conditions, is between 50 and 550 h/year, depending on the orientation of the surface. (Auth.)

B-36121

Crafford, J.E., Scholtz, C.H., **Phenology of stranded kelp degradation by the kelp fly *Paractora dreuxi mirabilis* (Helcomyzidae) at Marion Island,** *Polar biology,* 1987 7(5), p.289-294, 15 refs.

During heavy seas, bull-kelp *Durvillaea antarctica* (Cham.) Har. plants are stranded either singly or in wrack beds on Marion I. In the supralittoral zone, *Durvillaea* wrack is consumed chiefly by kelp fly larvae (the endemic *Paractora dreuxi mirabilis* Séguy), whilst two marine amphipods attack wrack in the eulittoral and sometimes in the supralittoral zone. During the summer of 1984, artificial *Durvillaea* deposits were established in the supralittoral zone of a beach close to the meteorological station and were closely monitored for 6 weeks thereafter. Eight days after deposition, temperatures inside the protected wrack bed reached 10 C above ambient, and *P. dreuxi* larvae attained a maximum biomass of 27 g/kg (dry mass) of kelp in the bed. After 30 days, wrack strings and a protected wrack bed had lost 80 and 65%, respectively, of their original dry mass. *P. dreuxi* larvae accounted for 35% of the dry mass loss in the wrack bed. *P. dreuxi* has an opportunistic and flexible ecological strategy, facilitated by a stable, interstitial biotope of particulate kelp detritus from which it colonizes fresh wrack. (Auth. mod.)

B-36122

Hunter, S., **Species and sexual isolating mechanisms in sibling species of giant petrels *Macronectes*,** *Polar biology,* 1987 7(5), p.295-301, Refs. p.300-301.

The two sibling species of giant petrels *Macronectes halli* and *M. giganteus* are the dominant avian scavengers in the southern ocean ecosystem. They breed sympatrically at a number of subantarctic sites. This paper synthesises data from a detailed study at South Georgia to examine the importance of various interspecific and intersexual differences between these closely related species. The most significant interspecific differences are a 6 week separation in the onset of breeding and the importance of seal carrion to male *M. halli,* the earlier breeding species. There is a strong sexual size dimorphism with females being only 75-80% of the weight of males in both species. Intersexual dietary differences are stronger than interspecific ones and females also have later primary moult schedules. Reproductive isolation and ecological adaptations are discussed in relation to the present distribution of giant petrels, comprising a more restricted subantarctic species *(M. halli)* and a widespread antarctic species *(M. giganteus).* It is suggested that the marked sexual dimorphism evolved before the two taxa became specifically distinct. (Auth. mod.)

B-36123

Kellermann, A., **Food and feeding ecology of postlarval and juvenile *Pleuragramma antarcticum* (Pisces; Notothenioidei) in the seasonal pack ice zone off the Antarctic Peninsula,** *Polar biology,* 1987 7(5), p.307-315, 29 refs.

Stomach contents of 275 postlarval and 269 one year old juvenile *Pleuragramma antarcticum* caught in Feb. 1982, Mar. 1981 and Nov. 1977 in the Bransfield Strait and adjacent waters were investigated. Juveniles, in Nov., fed mainly on calanoid copepods and *Oithona* spp. The principal food of postlarvae, in Feb., were *Oncaea* spp., eggs of calanoid copepods and tintinnids, whereas the staple food of juveniles in Feb. consisted of calanoid copepods of which copepodites of *Calanus propinquus* were most abundant. Eggs of *Euphausia superba* were frequently ingested by postlarvae and were the main component of the juvenile diet in the Antarctic Sound. Postlarvae, in Mar., preyed on *Oncaea* spp. and calanoid eggs. There was a shift from feeding on cyclopoid copepods by postlarvae to feeding on calanoids by juveniles. The food particle size increased as a function of fish length. Prey selection was apparently food density dependent with an inverse relationship between food abundance and selective feeding. This specific feeding behavior is likely to be an adaptation to the low zooplankton stocks of the high antarctic shelf waters to minimize food competition among the youngest age classes. Predation on krill eggs indicated that the frequent association of one year old juvenile *Pleuragramma antarcticum* with the antarctic krill is related to local spawning events. (Auth. mod.)

B-36128
Shinn, G.L., **Two new species of umagillid flatworms from the 20-rayed antarctic crinoid *Promachocrinus kerguelensis*,** *Canadian journal of zoology,* Apr. 1987 65(4), p.1001-1009, 18 refs.

Two new endosymbiotic turbellarians from the 20-rayed crinoid *Promachocrinus kerguelensis* are described from specimens collected off the western coast of the Antarctic Peninsula. *Desmote antarcticus* sp.n. differs from previously described members of the genus in the shape of the penis stylet, orientation of the terminal branches of the ovaries, and connections of the genital ducts to the exterior. *Parafallacohospes branfieldensis* gen. et sp. n. is distinctive among known umagillids in having a pair of broad lobes projecting from each side of the body. The anatomy of the reproductive system is similar to that of *Fallacohospes inchoatus* Kozloff except that *P. bransfieldensis* lacks a secondary uterus. In addition, *P. bransfieldensis* has a functional digestive tract with small intestinal ceca, whereas *F. inchoatus,* the only species in the genus *Fallacohospes,* lacks a digestive tract. In this respect, *Parafallacohospes* appears to be intermediate between *Desmote,* which has large intestinal ceca, and *Fallacohospes.* Both new species belong to the subfamily Bicladinae, which includes all other crinoid-inhabiting umagillid flatworms. (Auth.)

B-36131
BIOMASS Executive, **Meeting of the BIOMASS Executive, Paris, France, June 1, 1987,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* Aug. 1987 No.53, 11p.

The following was discussed at the Executive meeting: the recent BIOMASS workshops, on krill physiology, fish ecology and physical and chemical oceanography; the relation of the BIOMASS Executive to the SCAR Group of Specialists on Southern Ocean Ecology, with identification of several major research directions and the conclusion that there was scope for a rational division of labor and responsibility; activities of the BIOMASS Data Centre Advisory and a report by its manager concerning, mainly, acquisition of data and the form it should take; the Fifth Meeting of the CCAMLR Scientific Committee and the krill predator monitoring program; the future BIOMASS-related data analysis workshops; BIOMASS publications, including those published since June 1986, and a status of krill review to be published in 1988; finances, reflecting a continuing healthy financial situation for the Special Fund, but only $8,000 annually, from SCAR, in the Regular Fund; future meetings; and news items, including a report that Korea had recently completed its 6th research expedition to antarctic waters, that Spain sent an expedition to the Antarctic in summer 1986-1987, and some biological observations made by the Norwegian antarctic expedition organized by Norsk Polarinstitutt in early 1987.

B-36153
Van Rensburg, P.J.J., Skinner, J.D., Van Aarde, R.J., **Effects of feline panleucopaenia on the population characteristics of feral cats on Marion Island,** *Journal of applied ecology,* Apr. 1987 24(1), p.63-73, 21 refs.

This paper evaluates the effects of the artificial introduction of feline panleucopaenia (FPL) as a primary control measure of a feral cat population on Marion I. The population decreased from an estimated 3409 cats in 1977 (introduction of control factor) to 615 (S.E.=107) cats during 1982, suggesting an annual rate of decrease of 29%. Litter size decreased and the age structure changed significantly because of a decrease in subadult numbers. Age specific mortality rates were higher but followed the same pattern as in 1975 because there were fewer subadults but the same age structure of adults. The intrinsic rate of increase, as suggested by the survival and fecundity schedules of the population, was higher in 1975 owing to a greater proportion of adults and a higher fecundity in age class II. Antibody titres of FPL were lower in 1982 than in 1978 which illustrates that FPL did affect the cat population but is no longer spreading effectively. (Auth. mod.)

B-36154
McVean, A.R., Montgomery, J.C., **Temperature compensation in myotomal muscle: Antarctic versus temperate fish,** *Environmental biology of fishes,* May 1987 19(1), p.27-33, 12 refs.

Contraction time of an isolated white muscle from the temperate water *Girella tricuspidata* is proportional to temperature and inversely proportional to fish size. Between ambient (14 C) and 8 C muscle from all sizes of fish is similarly affected by temperature; the lower the temperature the more the contraction time is slowed. Below 8 C muscle from large fish is affected more than is muscle from small fish. Contraction time of white muscle in the antarctic notothenioid *Pagothenia borchgrevinki* is about twice as fast as that of *Girella tricuspidata* at temperatures between 2-12 C, but at normal body temperature, contraction time of muscle from *Girella tricuspidata* (14 C) is about twice as fast as that of *Pagothenia borchgrevinki* (-1.9 C). (Auth.)

B-36158
Wägele, H., **Distribution of some antarctic nudibranchs (Opisthobranchia),** *Journal of molluscan studies,* Aug. 1987 53(2), p.179-188, 24 refs.

The circumpolar distribution of the four revised species of doridacean nudibranchs: *Aegires albus, Bathydoris hodgsoni, B. clavigera* and *Austrodoris kerguelenensis,* is demonstrated, taking into consideration the known data from the literature and new localities from the Atlantic sector of the Antarctic. *A. albus* and *B. hodgsoni* are restricted to the High Antarctic Zone. *A. kerguelenensis* is widely distributed in the High Antarctic and Subantarctic Zone, whereas localities of *B. clavigera* are restricted to the High Antarctic Zone and the Atlantic sector of the Subantarctic Zone. (Auth.)

B-36179
Stahel, C.D., Nicol, S.C., Walker, G.J., **Heat production and thermal resistance in the little penguin *Eudyptula minor* in relation to wind speed,** *Physiological zoology,* July-Aug. 1987 60(4), p.413-423, Refs. p.422-423.

Wind is an important factor in avian energy budgets. The effect of wind speed on metabolic rate and partitional resistance in little penguins was examined at thermal neutral and cold ambient temperatures. Metabolic rate remained constant at thermal neutrality at wind speeds up to 4.7 m/s and correlated equally well with wind speed or the square root of wind speed during cold exposure. During cold exposure at zero wind speed, body and plumage resistance had attained maximum values, whereupon increased wind speed resulted in a decrease in total resistance. Results are compared with those obtained by similar experiments in king and emperor penguins by other workers. (Auth. mod.)

B-36180
Lee, R.E., Jr., Baust, J.G., **Cold-hardiness in the antarctic tick, *Ixodes uriae*,** *Physiological zoology,* July-Aug. 1987 60(4), p.499-506, 32 refs.

Ixodes uriae White (Ixodidae, Acarina) is the predominant tick on the Antarctic Peninsula. This species has a circumpolar distribution in both hemispheres and is associated with or known to parasitize 48 species of seabirds. Large colonies of 1,000 or more individuals of all life stages were found beneath rocks on the periphery of Adélie penguin rookeries near Palmer Station. All life stages were intolerant of freezing. Acclimation to temperatures between -12 and +25 C for 2 wk had no effect on the supercooling point of engorged immobile nymphs. Desiccation of engorged nymphs to 80% of their initial weight resulted in no change in supercooling points or glycerol levels.

In Jan., engorged nymphs enter a state of apolysis and lose mobility. This species exhibits the greatest range of thermal tolerance, from -30 to 40 C, reported for any antarctic terrestrial arthropod. Except for a short period associated with feeding, *I. uriae* remains in a permanent state of cold-hardiness throughout the year. (Auth. mod.)

B-36183

Detrich, H.W., III, Prasad, V., Ludueña, R.F., **Cold-stable microtubules from antarctic fishes contain unique alpha tubulins,** *Journal of biological chemistry,* June 15, 1987 262(17), p.8360-8366, 42 refs.

The cytoplasmic microtubules of antarctic fishes assemble from their tubulin subunits at physiological body temperatures in the range -2 to +2 C. The objective of this paper is to determine the structural features that enhance the assembly of antarctic fish tubulins at low temperatures. The structures of tubulin subunits from antarctic fishes, from 3 temperate fishes, and from a mammal (the cow *Bos taurus)* are compared. Peptide mapping demonstrated that the alpha tubulins of antarctic fishes were similar in structure, yet differed from the alpha chains of the dogfish and the cow (which, in turn, were similar to each other). In contrast, the beta tubulins from these organisms gave peptide patterns of near identity. Finally, the alpha chains of native tubulins from *N. coriiceps neglecta* and the cow differed in the sensitivity of their C-terminal domains to digestion by subtilisin. These results demonstrate that the alpha tubulins of antarctic fishes (but not their beta chains) differ structurally from those of temperate fishes and a mammal. (Auth. mod.)

B-36192

Lapin, B.P., Pisareva, N.A., Rubtsova, T.E., Jakevich, M.L., **Separation of lipophilic fractions by high-performance liquid chromatography,** *Journal of chromatogaphy,* Sep. 19, 1986 365(pt.2), p.229-235, 21 refs.

DLC QD271.J65

An approach to the preparative isolation of different lipid classes is described. It was applied to the separation of a lipophilic fraction from antarctic krill on a silica column using a multistep gradient (both the mobile phase composition and flow-rate were changed). Hydrocarbons (including those of the carotinoid type), sterol esters, waxes, triglycerides, free fatty acids, sterols, mono- and diglycerides, phosphatidylinositols, phosphatidic acids, phosphatidylethanolamines, lecithin and corresponding lyso-derivatives were isolated on a single column and some of them were identified by high-performance thin-layer chromatography, gas-liquid chromatography and mass spectrometry. These results are considerably in advance of those previously published. (Auth.)

B-36206

Brown, D.S., Pullan, N.B., **Notes on the shell, radula and habitat of *Chilina* (Basommatophora) from the Falkland Islands,** *Journal of molluscan studies,* May 1987 53(1), p.105-108, 11 refs.

Chilina and *Lymnaea* are the only freshwater snails found in the Falklands; *Chilina* occurs there at three localities; Roy Cove, West Falklands and Walker Creek and North Arm, Lafonia, East Falklands. Eighty-two specimens in spirit and dry shells were collected at these sites in 1984 and 1985. They are described, particularly as to shell structure, radulae, and central teeth. Photomicrographs of these features accompany the text.

B-36210

Mullins, B.W., Priddle, J., **Relationships between bacteria and phytoplankton in the Bransfield Strait and southern Drake Passage,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.51-64, 37 refs.

Bacterial biomass (cell numbers) and phytoplankton biomass (particulate chlorophyll *a)* were estimated at 27 and 43 stations respectively as part of the BIOMASS SIBEX program, in Bransfield Strait and Drake Passage during Jan.-Feb. 1985. Bacterial biomass ranged from 31.59 trillion to 62.34 trillion cells/sq m sea surface whilst phytoplankton biomass ranged from 8.5 to 298 mg chlorophyll *a*/sq m (both integrated to 200 m depth). Net phytoplankton species composition, described on the basis of vertical net hauls at 50 stations, also resembled that found previously in this area. The ratio of bacterial- to phytoplankton-carbon increased with depth, with a mean value of 9.32% for samples in the top 50 m of the water column but usually representing at least half of the microplankton biomass at depths exceeding 100 m. Correlation between bacterial and phytoplankton biomass was negative but not significant. It is suggested that variation in total chlorophyll *a,* dominated by large-celled diatoms, would not affect bacterial biomass which would be more closely linked to that of picophytoplankton. (Auth.)

B-36211

Parmelee, D.F., Parmelee, J.M., **Revised penguin numbers and distribution for Anvers Island, Antarctica,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.65-73, 9 refs.

Estimates of population sizes of penguins breeding at Anvers Island, Antarctic Peninsula, based on records from 1974 to 1986 are summarized. Adélie penguins *(c.* 28,458 pairs) are concentrated along the south coast of the island, and chinstrap penguins *(c.* 7,179 pairs) and gentoo penguins *(c.* 2,226 pairs) mostly in the western section. All 3 species breed side by side at two observed localities. The first records for the breeding area of macaroni penguins and of a vagrant king penguin are reported. Adélie and chinstrap populations have remained fairly stable over the last decade despite extensive human activity in the vicinity of some colonies. (Auth.)

B-36213

Christie, P., **Comparison between wet and dry oxidation methods for total nitrogen analysis of antarctic peat samples,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.87-90, 9 refs.

Between 1969 and 1981 an intensive study of ecosystem processes in two contrasting bryophyte communities on Signy I., South Orkney Is., was undertaken by numerous biologists. The two study sites were a semi-ombrogenous, relatively dry and well-drained moss turf community and a soligenous poorly-drained moss carpet community. During an 18-month study of the nitrogen dynamics of these sites core samples were collected at monthly intervals. The core collected from Sep. 1978 to Mar. 1979 were oven dried, and ground subsamples were analyzed and wet digestion followed by colorimetry. Organic carbon (C) was also determined using dry combustion. This paper compares the accuracy and precision of the two methods of analysis for total N content of peat. (Auth.)

B-36214

Lightowlers, P.J., **New or noteworthy mosses from the Antarctic Peninsula region,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.91-94, 12 refs.

Brachythecium glaciale B.S.G. and *B. majusculum* M.E. Newton are reported from the Antarctic Peninsula for the first time. Three new collections of *Orthotrichum rupestre* Schwaegr. from the Danco Coast are noted and specimens of *Pterygoneurum* from Signy I. are referred to *Pterygoneurum ovatum* (Hedw.) Dix. (Auth.)

B-36215

McCann, T.S., **Further range expansion of introduced reindeer *Rangifer tarandus* on South Georgia,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.95-98, 11 refs.

Reindeer were introduced to South Georgia from Norway on 3 occasions. The first introduction of 10 deer was made to the Barff

Peninsula in Nov. 1911. By 1973 this herd occupied all vegetated areas on the Barff Peninsula and had expanded its range by circumventing the Cook and Heaney glaciers to form another herd in the Royal Bay area. A second introduction of 5 deer was made to the Busen Peninsula in 1911-12 but this herd was lost in a snowslide. The third introduction of 7 deer in 1925 was also to the Busen Peninsula. When studied extensively in 1973-76, this herd was observed not to occupy all the vegetated areas available within its potential range bounded by the Neumayer and Fortuna glaciers. This included Fortuna Bay which had been occupied by the first Busen herd. This note describes range expansion that has occurred between 1976 and 1986 in the Busen herd.

B-36216

Bonner, W.N., **Right whale sightings around South Georgia,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.99-103.

Sightings of right whales reported here were made in Feb. and Mar. 1958-59 by whale catchers operating out of Crytviken while searching for fin and sei whales. The most common sightings were of single individuals or pairs, although larger groups were also seen. More whales were seen in Mar. than in Feb. Because of the unsystematic way in which these data were collected it is not possible to draw useful conclusions from them regarding the abundance of right whales at that time and place.

B-36219

Yamamoto, Y., Honda, K., Hikada, H., Tatsukawa, R., **Tissue distribution of heavy metals in Weddell seals *(Leptonychotes weddellii)*,** *Marine pollution bulletin,* Apr. 1987 18(4), p.164-169, Refs. p.168-169.

Tissue distributions of heavy metals were investigated in the Weddell seal collected around Showa Station. Generally, the metal concentrations were high in liver and kidney and low in brain, blubber and skin. Fe in blood and spleen, Zn in bone, and Mn and Cd in pancreas and gastrointestinal organs were also relatively high. Wide variations of the metal concentrations in different bones were also observed. The concentrations of Fe and Cd were positively correlated with moisture content of the bones, while those of Mn and Zn increased with increase of Ca content in the bone. Majority of the metal burden in the body existed in muscle and liver. A relatively high burden of Cd was in the kidney. Based upon these results, the suitability of the tissues of a seal for ecological and toxicological comparisons is discussed. (Auth.)

B-36223

Dahms, H.-U., Dieckmann, G.S., ***Drescheriella glacialis* gen.nov., sp. nov. (Copepoda, Harpacticoida) from antarctic sea ice,** *Polar biology,* 1987 7(6), p.329-337, 12 refs.

The diagnosis of a new genus *Drescheriella* belonging to the family Tisbidae and description of a new species *Drescheriella glacialis* sp. nov. are presented. Based on character differentiation of copepodite appendages it is suggested that *Drescheriella* gen. nov. is the apomorphic sister group of *Tisbe.* Live specimens of all developmental instars were found in the lower 20 cm of sea ice cores indicating that reproduction and development occur within the ice. The new species was the only harpacticoid inhabiting sea ice of the eastern Weddell Sea in varying abundance. (Auth.)

B-36224

Ikeda, T., Thomas, P.G., **Moulting interval and growth of juvenile antarctic krill *(Euphausia superba)* fed different concentrations of diatom *Phaeodactylum tricornutum* in the laboratory,** *Polar biology,* 1987 7(6), p.339-343, 32 refs.

Juvenile krill *(Euphausia superba)* were fed the diatom *Phaeodactylum tricornutum* at concentrations ranging from 0.0-5.0 mgC/l. Intermoult period (IP) decreased, but an increment of body length per moult (deltaBL) of juvenile krill increased, up to a concentration of 1.0 mgC/l. No further effect of food concentrations on IP or deltaBL was seen at concentration beyond 1.0 mgC/l. IP plateaued at 23.8 days and deltaBL, 1.14 mm. The maximum daily growth rate (deltaBL/IP) of juvenile krill was calculated to be 0.047 mm/day. DeltaBL and IP were correlated and the relationship is expressed as deltaBL= -0.0066IP+2.47 ($r=0.58$, $n=141$, $P<0.01$). Growth conditions of krill in the southern ocean are discussed in terms of available food concentration. (Auth.)

B-36225

Brinton, E., Loeb, V.J., Macaulay, M.C., Shulenberger, E., **Variability of *Euphausia superba* populations near Elephant Island and the South Shetlands: 1981 vs. 1984,** *Polar biology,* 1987 7(6), p.345-362, Refs. p.361-362.

Mar. 1981 and 1984 *Euphausia superba* populations were compared using acoustics and net catches near Elephant I., the South Shetlands, and in the Bransfield Strait. In 1981, krill tended to form large, thick swarms and in 1984, smaller, more dispersed, shallower patches. Mar. body lengths of juvenile-adult krill were 22-59 mm in 1981 and 13-59 mm in 1984. Near Elephant I. in 1981, krill >45 mm were most numerous; in 1984 sizes <45 mm were dominant. In Mar. 1984, the larger (>45 mm) body-size group was prereproductive and occurred from just west of Elephant I. westward into waters north of the South Shetlands; in 1981 the larger krill were postreproductive and more widely distributed in the Elephant I. area. Variation in maturity composition across 1981 swarms, patches, and random transects was like variation among the random 1984 tows; spatial distributions were more heterogeneous in 1984. (Auth. mod.)

B-36226

Loeb, V.J., Shulenberger, E., **Vertical distributions and relations of euphausiid populations off Elephant Island, March 1984,** *Polar biology,* 1987 7(6), p.363-373, refs. p.372-373.

Distributional relationships are described for post-larval and larval *Euphausia superba* and *Thysanoessa* sp. (probably *Macrura)* and post-larval *Euphausia frigida* collected in 0-70/80 m and 0-175/200 m depth ranges with a MOCNESS sampler north of Elephant I. during 17-23 Mar. 1984. Larval *E. superba* (predominantly calyptopes stage 2 and 3) were rare shallower than 80 m at night. Day catches of post-larval *E. superba* were small and night catches were primarily near the top of the thermocline above 50 m depth. *Thysanoessa* sp. occurred throughout the 0-200 m depth range and was abundant in the upper 80 m both night and day. *E. frigida* migrated to the upper 80 m at night from deeper day depths. Larval stages of *E. superba* and post-larval stages of all 3 species demonstrated independent and variable vertical distribution patterns both night and day. An increase in larval and decrease in post-larval *E. superba* abundances between 0-80 m was associated with an intrusion of cold water at depth. Fluctuations in the distribution and abundance of *Thysanoessa* sp. and distribution of *E. frigida* did not appear to be influenced by physical parameters within the upper 80 m. Within the 0-80 m depth range, the distributions of these two species differed from each other and from *E. superba* and showed large tow to tow variability that could not be related to physical parameters in the upper water column. (Auth. mod.)

B-36227

Ishii, H., Omori, M., Maeda, M., Watanabe, Y., **Metabolic rates and elemental composition of antarctic krill, *Euphausia superba* Dana,** *Polar biology,* 1987 7(6), p.379-382, 19 refs.

This paper provides information on excretion rates and elemental composition (C, N, P) of krill based on experiments carried out on board the TV *Umitaka Maru* in summer 1983-1984. Elemental composition values, relationships between elemental composition and body dry weight, respiration rates, relationships between excretion rates and body dry weight, and respiration rates, ammonia and phosphate excretion rates, and minimum carbon requirement values are shown and discussed.

B-36236

Shevchenko, IU.S., Belkin, V.Sh., Astakhov, O.B., Akhmedov, N.Kh., **Study of external and internal morphological signs in albino rats during adaptation to high altitudes** [Izuchenie ekster'ernykh i inter'ernykh morfologicheskikh pokazateleĭ belykh krys v hode adaptatsii k usloviiam vysokogor'ia Antarktidy], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.80, p.153-167, In Russian. 9 refs.

In order to better understand human physiological processes in adaptation to the extreme antarctic conditions, a study in 400 albino rats conducted during the 23rd Soviet Antarctic Expedition is reported. Body mass dynamics, heart weight and adrenal and testicular changes in two groups of animals, at Vostok and Mirnyy stations and on the road at varying altitudes (from 1860 3600 m above sea level), are tabulated and results are compared. The best physiological responses are found in animals allowed a gradual adaptation to altitude.

B-36237

Montgomery, J.C., McVean, A.R., **Brain function in antarctic fish: activity of central vestibular neurons in relation to head rotation and eye movement,** *Journal of comparative physiology,* 1987 160(2), p.289-293, 18 refs.

Recordings were made from central vestibular neurons responding to horizontal head rotation in antarctic fish, *Pagothenia borchgrevinki,* at a temperature close to O C. The spontaneous activity of these units varied between 0 and 56 Imp/s with a mean value of 20. Almost all units responded to horizontal rotation with a maximum firing rate that was approximately in phase with head velocity, either towards the recording side (type I units) or away from the recording side (type II), with no alteration of firing pattern during saccadic eye movements. The mean gain of these units was 2.6 Imp/s/deg/s at 0.35 Hz which is higher than that reported for central vestibular neurons in other fish. (Auth.)

B-36238

Groscolas, R., **Changes in body mass, body temperature and plasma fuel levels during the natural breeding fast in male and female emperor penguins *Aptenodytes forsteri*,** *Journal of comparative physiology,* 1986 156(4), p.521-527, 31 refs.

Changes in body temperature (Tb), body mass, plasma glucose, free fatty acid (FFA) and beta-hydroxybutyrate levels were investigated in free-living male and female Emperor penguins throughout the 115- and 45-day, respectively, natural breeding fast on the sea-ice. Moreover, changes during a prolongation of this fast that mimicked the supplementary energy expense for walking back to the open sea, were also studied in captive emperors. Results show a decrease of the daily weight loss (DWL), Tb and plasma fuel levels during the days following the arrival in the breeding area; plasma FFA levels were slightly and markedly increased during oesophageal 'curd' secretion in males, and egg-yolk formation in females, respectively. Marked hyperthermia and hyperglycemia was observed during egg laying in females. Long-term natural fasting was characterized by homeothermia, maintenance of high plasma glucose and moderate plasma FFA levels, and progressive modest ketosis; during prolongation of the fast, marked increases in DWL and decreases in plasma FFA and beta-hydroxybutyrate were found. (Auth. mod.)

B-36239

Altringham, J.D., Johnston, I.A., **Evolutionary adaptation to temperature in fish muscle cross bridge mechanisms: tension and ATP turnover,** *Journal of comparative physiology,* 1986 Vol.156(B6), p.819-821, 12 refs.

Force and ATPase activity were measured in skinned, fast muscle fibers isolated from the myotomes of antarctic, temperate and tropical fish. Maximum isometric tension was inversely related to normal environmental temperature, when measured at -5 to O C. When compared within the normal temperature range of each species, tensions were rather similar. In contrast, the muscle fibers of all 3 species had similar cross bridge cycle times over the entire temperature range studied. This results in a more economical maintenance of force at normal body temperatures in muscle fibers from the antarctic fish. (Auth.)

B-36240

Brandini, F.P., Kutner, M.B.B., **Composition and distribution of summer phytoplankton in the Bransfield Strait, Antarctica,** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.3-11, 20 refs.

Surface phytoplankton samples were obtained in the Bransfield Strait by the R/V *Prof. W. Besnard* during the First Brazilian Antarctic Expedition, to study the species composition, distribution and biomass in relation to water masses and other ecological parameters. Nanoplanktonic organisms smaller than 10 micron made up nearly 99% of the phytoplankton population in all the stations sampled. These organisms were primarily represented by phytoflagellates of different size fractions. Organisms of 6-10 micron, mostly cryptophycean-like cells, were inversely related in number to the ciliate population. This shows that the trophic relationship between both populations could be an important fact to explain the dynamics of the food chain in the antarctic pelagic ecosystem. (Auth.)

B-36241

Cunha Lana, P. da, Blankensteyn, A., **Pelagic polychaetes collected aboard the *Barão de Teffé* during the 1st Brazilian Antarctic Expedition** [Poliquetas pelégicos coletados pelo N. Ap. OC. *Barão de Teffé* durante a 1a Expedição Antártica Brasileira], *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.13-22, In Portuguese with English summary. 18 refs.

This work is based on the analysis of 24 zooplanktonic samples collected aboard the R/V *Barão de Teffé* during the Brazilian Antarctic Expedition 1982-1983. A small group of pelagic polychaetes, made up of 6 species, was identified and described: *Tomopteris carpenteri, Tomopteris planktonis, Rhynchonerella bongraini, Typhloscolex mülleri, Travisiopsis levinseni* and *Pelagobia longicirrata.* Some comments are made on the distribution and abundance of these species, mainly in the Weddell Sea area. (Auth.)

B-36242

Ngan, P.V., Gomes, V., Suzuki, H., **Cytogenetic studies of antarctic fishes, Pt 1** [Estudos citogenéticos de peixes antárticos, 1], *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.23-27, In Portuguese with English summary. 13 refs.

Chromosomal preparations of *Notothenia gibberifrons, Trematomus bernacchii* and *Trematomus hansoni* of the Nototheniidae family were obtained from kidney tissues by air-drying method. The fishes were collected in the Bransfield Strait during the 2nd Brazilian expedition to Antarctica, 1983-1984. For *N. gibberifrons* chromosomes of 9 mitotic cells were counted. Five had 2n=46 and 4 had 2n=45. For *T. bernacchii* chromosomes of 11 cells and for *T. hansoni* chromosomes of 6 cells were counted. All had 2n=48. Karyotypes were

mounted and the chromosomes were classified in morphological types. (Auth.)

B-36243

Ngan, P.V., Suzuki, H., Gomes, V., **Biochemical and physiological studies of the antarctic krill. 1. On the female-specific protein (Vitellogenic Protein) in *Euphausia superba* Dana,** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.29-33, 16 refs.

Extracts of muscle proteins of krill, *Euphausia superba* Dana, were analyzed on polyacrylamide vertical flatbed gel electrophoresis. Two fractions of low mobility and high concentration were found in electropherograms of adult females. One of them is believed to have its concentration increased during maturation. This fraction may exist in very small quantities in some adult males and subadult males and females. The other can be found only in adult females. Histochemical tests showed that they are of glycolipoprotein nature. Experiments with extracts of hepatopancreas and of eggs suggested that they may exist in these two sites. (Auth.)

B-36244

Phan, M.T., **Histology of retina in fishes from Bransfield Strait** [Histologia da retina de peixes antárticos do Estreito de Bransfield], *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.35-42, In Portuguese with English summary. 30 refs.

Retinas of antarctic fishes were studied in an attempt to establish a correlation between environment, behavior and retinal organization. The fishes used were *Notothenia larseni, Notothenia nudifrons, Electrona antarctica* and a larva of *Chionodraco rastrospinosus,* and were collected by the research vessel *Prof. W. Besnard* in the Bransfield Strait, during the 1st Brazilian expedition to Antarctica in 1982/83. (Auth.)

B-36245

Setubal Pires, A.M., **Vertical distribution of euphausiid larvae (Crustacea) in the Bransfield Strait during the 1st Brazilian Antarctic Expedition (Summer 1982/83),** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.43-51, 29 refs.

Krill larval abundance and distribution were studied during 1982/1983 at Bransfield Strait. The stages found were calyptopis I to III and furcilia I. No eggs, nauplii or metanauplii were caught. Calyptopis occurred with low density (100 larvae/1000 cu m), and calyptopis I was largely the dominant stage. Furcilia I was rare and scarce (24 larvae/1000 cu m). Larvae of *Euphausia frigida* occurred sporadically, and only metanauplius and furcilia stages were present. *Thysanoessa macrura* were the most abundant larvae found and occurred with a maximum density of 2.765 larvae/1000 cu m. Furcilia predominate upon calyptopis stages, and was more abundant in the uppermost layer. More advanced larval states of *T. macrura* and *E. frigida,* in relation to *E. superba* were found. This fact suggests that the krill larvae appear later in the season than the larvae of the other two species. (Auth.)

B-36246

Bianco Rossi-Wongtschowski, C.L. del, Yamaguti, N., **Fish from the Bransfield Strait collected during the 1st Brazilian Antarctic Expedition (PROANTAR),** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.53-62, 49 refs.

Antarctic fish collected on cruises *Prof. W. Besnard* in the Bransfield Strait, during the 1st Brazilian expedition to the Antarctic, in 1983, are studied. Fish were captured using rectangular dredges, Bongo and Issacs Kidd nets. The occurrence of 10 species belonging to 4 families was recorded, comprising 6 Nototheniidae, 2 species of Harpagiferidae, one species of Bathydraconidae and one of Myctophidae. *Notothenia nybelini* was the dominant species. Morphological comparisons are made of the most common species and biological data of *Notothenia nybelini* are given, such as size distribution, length/weight relationship and gonadal stages. The species distribution is analyzed in relation to hydrographical conditions. (Auth.)

B-36247

Sassi, R., Nascimento Melo, G. do, **Tintinnina (Protozoa-Ciliophora-Oligotrichida) from the 1st Brazilian expedition to the Antarctic,** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.63-83, Refs. p.81-83.

Thirteen species of Tintinnina from plankton samples of antarctic surface waters are discussed. Three species, represented only by empty loricas, are alien; 2 *(Amphorides laackmanni* and *Tintinnopsis bacillaria)* occur both in and outside the Antarctic; the remaining species *(Codonellopsis balechi, C. gaussi, Coxliella frigida, E. intermedia, Cymatocylis convallaria, C. drygalskii, C. vanhoeffeni* and *Laackmanniella naviculaefera)* are endemic to the antarctic seas. *Cymatocylis convallaria, C. drygalskii* and *T. bacillaria* were the most representative Tintinnina in this study. *Amphorides laackmanni, D. ganymedes, E. undella* and *T. bacillaria* are first recorded for the Antarctic; *Coxliella intermedia* and *Cymatocylis vanhoeffeni* are first recorded for the Bransfield Strait. Description, measurements, drawings, world distribution and complete synonymies are furnished for all species. Changes in the synonymic lists of *C. drygalskii, C. vanhoeffeni* and *E. undella* are proposed. (Auth. mod.)

B-36248

Teixeira, C., Brandini, F.P., Aidar Aragão, E., Sarti, C.C., **Primary production and phytoplankton standing stock along the Bransfield Strait (Antarctica),** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.85-97, 29 refs.

Phytoplankton standing stock (=cholophyll-*a)* varied in Bransfield Strait, from 0.23 to 2.40 mg/cu m in surface waters and from 6.25 to 28.94 mg/sq m within the euphotic zone. Photosynthetic rates varied from 0.01 to 1.91 mgC/sq m/h within the euphotic zone down to 4% depth in terms of total radiation incidence on the surface. Dark fixation represented from 12.8 to 100% of the C-14 fixation in presence of light. In relation to the phytoplankton cell size, the fraction smaller than 20 micron accounted for an average of 95.7% of the total photosynthetic production of organic matter. The results obtained are compared with those from Brazilian waters. The low values for standing stock and primary production and the high values of C-14 dark fixation recorded show that the phytoplankton primary production potential in the Bransfield Strait waters was similar to that of oligotrophic Brazilian oceanic waters. (Auth. mod.)

B-36268

Broady, P.A., **Floristic survey of algae at four locations in northern Victoria Land,** *New Zealand antarctic record,* 1987 7(3), p.8-19, 17 refs.

During 1984-85 four weeks were spent in northern Victoria Land with the West German GANOVEX IV expedition. The main aim was to describe the vegetation on steam-warmed ground at the summit of the volcano Mt Melbourne. However, in addition a general descriptive survey was made of bryophyte, lichen and algal vegetation at 4 localities; Inexpressible Island, Edmondson Point, Cape Washington and the vicinity of the West German summer station, Gondwana Station, in Gerlache Inlet. The detail of the survey was limited by the time available; six seven, two and one days were spent at each location, respectively. This paper summarizes the observations made on the algal vegetation and provides a first description of the flora in this region. (Auth.)

B-36274
Skarlato, O.A., ed, Alekseev, A.P., ed, Liubimova, T.G., ed, **Biological resources of the Arctic and the Antarctic** [Biologicheskie resursy Arktiki i Antarktiki], Moscow, Nauka, 1987, 447p., In Russian. For individual papers see 42-297 and 42-298, or B-36275 through B-36284. Refs. passim.

On the basis of the last several years' research conducted by members of various Soviet institutes, this book presents a compendium of articles dealing with the biology and related meteorology and oceanography of the Arctic and Antarctic. The review-type articles contain a wealth of references to both Soviet and non-Soviet literature.

B-36275
Liubimova, T.G., **Basic principles of spatial and quantitative distribution of antarctic biological resources** [Osnovnye zakonomernosti prostranstvennogo i kolichestvennogo raspredeleniia bioresursov Antarktiki], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.239-258, In Russian. Refs. p.254-258.

An analysis is presented of the ecological characteristics of dominant groups and species of marine organisms relating to, or depending on, the oceanographic structure typical of the Antarctic. Possibilities of economic exploitation of the biological resources found are examined, with the conclusion that the occurrence of numerous mesopelagic and bentho-pelagic fishes populating the shelf waters represents as profitable fishing perspectives as those offered by krill.

B-36276
Permitin, IU.E., **Study of the fauna and distribution of benthic fish** [K issledovaniiu fauny i rasprostraneniia donnykh ryb Antarktiki], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.258-296, In Russian. Refs. p.292-296.

Studies of species composition, distribution, ecology and bathymetric distribution of benthic antarctic ichthyofauna are reviewed. Investigations of antarctic fishing possibilities and industrial potential, carried out by Soviet scientists in the last two decades, are discussed. It is pointed out that those investigations have changed and enlarged current understanding of taxonomic composition and zoogeography of antarctic fishes. Numerous and detailed tables are included from the literature reviewed.

B-36277
Shust, K.V., **Distribution and principal biological features of antarctic notothenid fishes** [Raspredelenie i osnovnye cherty biologii massovykh nototenoidnykh ryb Antarktiki], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.296-320, In Russian. Refs. p.317-320.

Observation of principal stages of the life cycle of benthic and pelagic fishes, and their spatial and quantitative distribution in relation to their habitat, is reported. Tables are reviewed with data on the geographic distribution, morphology, growth, diet etc. of numerous species of fish in antarctic waters. Data on population and species dynamics are examined in the light of possible industrial exploitation, with the conclusion that they warrant a rational use of fish resources in the Antarctic.

B-36278
Liubimova, T.G., Shust, K.V., Popkov, V.V., **Ecological properties of mesopelagic fish of the Myctophidae family from the southern ocean** [Osobennosti ekologii mezopelagicheskikh ryb semeĭstva Myctophidae IUzhnogo okeana], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.320-337, In Russian. Refs. p.334-337.

Results are examined of investigations on the biology and distribution of mesopelagic fish Myctophidae in relation with the ecological conditions of the Antarctic Circumpolar Current. The determination of principles governing the formation and stability of commercial concentrations, and their dependence on the hydrological and dynamic regime, is discussed. Based on the density and biomass data, recommendations are made with regard to the best area, date, and size of possible catches of the Myctophidae.

B-36279
Lisovenko, L.A., **Reproductive biology of antarctic fishes in relation to their environment** [Reproduktivnaia biologiia antarkticheskikh ryb v sviazi s usloviiami ikh obitaniia], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.337-357, In Russian. Refs. p.355-357.

Literature is reviewed and data are analyzed regarding time and properties of oogenesis, time of spawning, egg dimensions, fertility, embryogenesis and larval hatching, in relation to ecological conditions and species characteristics, in antarctic fish. From the evidence examined, it is concluded that, when compared to shelf water fish, mesopelagic fish display significantly higher breeding indexes.

B-36280
Efremenko, V.N., **Species composition and distribution of antarctic ichthyoplankton** [Vidovoĭ sostav i raspredelenie ikhtioplanktona v Antarktike], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.358-373, In Russian. Refs. p.371-373.

Significant differences are found in a comparison study between mesopelagic and benthic fishes of West Antarctica and adjacent waters in terms of species composition and egg-and-larval distribution. The differences are discussed. A table showing name and developmental stages of eggs and larvae in 52 species of fish belonging to 11 families, from Scotia Sea, is included.

B-36281
Dolzhenkov, V.N., Makarov, R.R., Soliankin, E.V., Shevtsov, V.V., **Biological properties and distribution of *Euphausia superba* in high latitudes (as in East Antarctica)** [Biologicheskie osobennosti i raspredelenie *Euphausia superba* v vysokoshirotnoĭ chasti areala (na primere Vostochnoĭ Antarktiki)], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.374-391, In Russian. Refs. p.389-391.

On the basis of Soviet investigations conducted in shelf waters of East Antarctica, an analysis of data on krill distribution in that area is presented. Discussion includes an evaluation of the quantitative distribution and comparison of life cycle properties in krill from different areas.

B-36282
Spiridonov, V.A., **Investigation of the population age structure in *Euphausia superba* Dana in areas of the Antarctic Peninsula and adjacent waters** [Issledovaniia vozrastnoĭ struktury populiatsii *Euphausia superba* Dana na primere raĭona Antarkticheskogo Poluostrova i sopredel'nykh vodȷ], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.391-414, In Russian. Refs. p.410-414.

Discussed are results of investigations on krill population structure and life history, with a review of methods used by other workers in similar investigations. Data shows inter-annual stability of the population size structure determined in various areas adjacent to the Antarctic Peninsula. In conclusion, however, the assertion is made that krill population age structure cannot be determined with any one of the specific methods reviewed.

B-36283
Ivashin, M.V., Borodin, R.G., **Antarctic whales: regulatory measures, industry and current state of the stock** [Kity Antarktiki: mery regulirovaniia, promysel i sovremennoe sostoianie zapasov], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.414-428, In Russian. Refs. p.427-428.

Whaling regulations, dictated by different criteria based on the use of mathematical modelling methods, are reviewed. An assessment is made of past and present whale reserves, and an evaluation is presented of industrial exploitation prospects in the light of calculations determining the numbers of exploitable species and their population. Tables with whaling statistics, by country, species, and fishing area in the Southern Hemisphere between 1910 and 1979, are included.

B-36284
Popov, L.A., **Seal resources on antarctic ice** [Resursy ledovykh form tiuleneĭ Antarktiki], Biologicheskie resursy Arktiki i Antarktiki (Biological resources of the Arctic and the Antarctic) edited by O.A. Skarlato, A.P. Alekseev and T.G. Liubimova, Moscow, Nauka, 1987, p.429-440, In Russian. 17 refs.

Based on analysis of Soviet and foreign investigations, the distribution and state of the stock is given for different types of seal—crabeater, leopard, Weddell and Ross seals. Also discussed are data on their icy environment, diet, reproduction, inter-species relationships and exploitation.

B-36293
Thomas, P.G., Ikeda, T., **Sexual regression, shrinkage, re-maturation and growth of spent female *Euphausia superba* in the laboratory,** *Marine biology,* 1987 95(3), p.357-363, 32 refs.

Live female *Euphausia superba,* Dana were collected from Prydz Bay in Jan. 1985, and observations of intermoult period, growth and maturation changes were made on individuals which spawned and were subsequently maintained in the laboratory for 12 mo. Over this experimental period an intrinsic cyclic reproductive pattern was observed. Following spawning, there was a regression of the female copulatory organ, the thelycum, coupled with a decrease in body length and an increase in the krill's mean intermoult period. This was followed by a period of sexual re-maturation, associated with positive growth and a decrease in the mean intermoult period. This study indicates multi-year spawning of *E. superba* and a life-span greater than 4 yr. (Auth.)

B-36294
Davidson, A.T., Marchant, H.J., **Binding of manganese by antarctic *Phaeocystis pouchetti* and the role of bacteria in its release,** *Marine biology,* 1987 95(3), p.481-487, 46 refs.

The growth of Antarctic *Phaeocystis pouchetti* and associated bacteria in culture, and the binding and release of manganese were investigated using cultures derived from three clonal isolates collected from Prydz Bay, Antarctica, in Nov. and Dec. 1982. The cultured strains accumulated manganese from the culture medium. The concentration of Mn2+ in the alga was up to 58 times that of the medium. The Mn2+ apparently binds to the mucilage secreted by the cells and gives the alga its characteristic brown color. Oxidation or complexing of Mn2+ by *P. pouchetti* was also indicated. Bacterial growth on the mucilage is inhibited in rapidly growing cultures by acrylic acid produced in the mucilage. Once the growth of *P. pouchetti* and production of acrylic acid slow, bacterial numbers increase, leading to the solubilization of the mucilage and the release of Mn2+. In cool-temperate, subpolar and polar seas, where *P. pouchetti* may form dense blooms, the binding and subsequent release of manganese may have important consequences for competing phytoplankton. (Auth.)

B-36296
Udvardy, M.D.F., **Biogeographical realm Antarctica: a proposal,** *Royal Society of New Zealand. Journal,* June 1987 17(2), p.187-194, 46 refs.

This paper discusses the place and extent of the Antarctic Realm within a biogeographic system of the world. For this realm, four biogeographical provinces (Maudlandia, Marielandia, Insulantarctica and Neozealandia) are proposed. Brief justifications for this proposal are offered. (Auth.)

B-36297
Fleming, C.A., **Comments on Udvardy's biogeographical realm Antarctica,** *Royal Society of New Zealand. Journal,* June 1987 17(2), p.195-200, 18 refs.

The author reviews Udvardy's biogeographical realms of the Southern Hemisphere, disagreeing with the concept that New Zealand has greater historic similarities with southern oceanic islands and southern Chile. He argues instead that the biota of New Zealand and Australia have a more common biogeographical heritage and should be linked, each being a sub-realm in a larger Australasian Realm.

B-36298
McClintock, J.B., Pearse, J.S., **Biochemical composition of antarctic echinoderms,** *Comparative biochemistry and physiology,* 1987 86B(4), p.683-687, 20 refs.

The biochemical compositions of the body components of 24 species of echinoderms from McMurdo Sound were ascertained. These included 14 species of asteroids, 3 species of ophiuroids, 3 species of echinoids, 3 species of holothuroids, and one species of crinoid. Levels of ash were high, reflecting large amounts of skeletal material in the asteroid body wall, the ophiuroid disc and arms, the echinoid test, spines and lantern, the holothuroid body wall and the crinoid cirri, calyx and arms. Levels of insoluble and soluble protein and lipid were high in the nutrient storage organ (pyloric cecum) of the asteroids and the gut of the ophiuroids. Analyses of the biochemical composition of the gonads of 16 echinoderm species reveal high levels of lipid and soluble and insoluble protein. In 88% of the species levels of lipid were higher in ovaries when compared to testes. Levels of carbohydrate were low in all body components. The biochemical composition of antarctic echinoderms is similar to species from other latitudes. High levels of lipid in ovaries of most antarctic echinoderms appear to be related to the preponderance of lecithotrophy at high latitudes. (Auth. mod.)

B-36300
Baust, J.G., Lee, R.E., Jr., **Multiple stress tolerance in an antarctic terrestrial arthropod: *Belgica antarctica*,** *Cryobiology,* Apr. 1987 24(2), p.140-147, 31 refs.

Terrestrial arthropods of the maritime Antarctic experience a diverse range of environmental stressors including extended periods of ice and snow cover, anoxia, immersion in water of variable pH and salinity, and extensive habitat drying. The collembolan *Cryptopygus antarcticus* and the mite *Alaskozetes antarcticus* seasonally depress whole body supercooling points to avoid the lethal effects of freezing. Alternatively, the wingless chironomid *Belgica antarctica* has a relatively limited supercooling capacity (between -6 and -8 C) and tolerates extracellular freezing. The lower limit of freeze tolerance remains unchanged near -13 C throughout the year in *B. antarctica.* Summer larvae tolerate dehydration to a limit of 35% of initial body weight as well as extended periods of anoxia and immersion in freshwater and saltwater. Two weeks of exposure to variable pH (3-12) induced no mortality. (Auth.)

B-36301
Bartsch, I., ***Agaue obscura* (Acari: Halacaridae) n.sp., a new circumpolar antarctic mite,** *Canadian journal of zoology,* June 1987 65(6), p.1343-1345, 3 refs.

Agaue obscura n.sp., a circumpolar antarctic species, is described. It is closely related to species known from Argentine waters and from deep-sea basins in the south and north Atlantic Ocean. Its legs, gnathosoma, and idiosoma are set with cuticular spinelets and filaments, which trap large amounts of detritus. This detritus coating might protect the mite from visual, tactile, or chemical detection by predators. (Auth.)

B-36306
O'Brien, D.P., **Direct observations of the behavior of *Euphausia superba* and *Euphausia crystallorophias* (Crustacea:Euphausiacea) under pack ice during the antarctic spring of 1985,** *Journal of crustacean biology,* Aug. 1987 7(3), p.437-448, 32 refs.

Direct field observations using SCUBA were made of *Euphausia superba* and *Euphausia crystallorophias* under the pack ice off Enderby Land, and aspects of their behavior were recorded using still, video, and cine photography. Swarms of *E. superba* were generally composed of 20-50 individuals (range 5-1,000), of which >90% were seen feeding on algae growing on the undersurface of the ice. *Euphausia crystallorophias* formed larger swarms that occupied the region approximately 1-5 m below the ice. Preliminary fecal and ice algal composition analyses indicate that *E. superba* feeds selectively on certain species of epontic algae and that the two euphausiid species do not compete directly for the same food source under the ice. Although a range of escape responses was displayed by both species, *E. superba* reacted generally with an individual back-flip response and *E. crystallorophias* with a coordinated pleopod swimming response. Data from echo soundings combined with high resolution video images, obtained by lowering a camera into the scattering layer beneath the ship, revealed that adult *E. crystallorophias* undertake vertical migration at this time of the year. However, evidence from a night dive suggested that swarms of juveniles and subadults did not migrate, but maintained their daytime distribution under the ice during darkness. Swarm formation and maintenance at this time of year are discussed in relation to feeding behavior in *E. superba.* (Auth.)

B-36307
O'Brien, D.P., **Description of escape responses of krill (Crustacea:Euphausiacea), with particular reference to swarming behavior and the size and proximity of the predator,** *Journal of crustacean biology,* Aug. 1987 7(3), p.449-457, 19 refs.

Observations of the escape responses of *Euphausia superba* and *Euphausia crystallorophias* under pack ice and of *Nyctiphanes australis* in southeast Tasmania are discussed together with previously published data on the escape reactions of these and other euphausiids. Similarities in the form of the escape response for surface-swarming species of euphausiids are apparent. It is proposed that there are three levels of escape response whose manifestation is primarily dependent upon the aggregative state of the prey and the size and proximity of the predator. The adaptive significance of the three levels of response is discussed in relation to predator evasion. (Auth.)

B-36308
Ferrari, F., Dojiri, M., **Calanoid copepod *Euchaeta antarctica* from the southern ocean Atlantic sector midwater trawls, with observations on spermatophore dimorphism,** *Journal of crustacean biology,* Aug. 1987 7(3), p.458-480, 40 refs.

Stage V and VI copepodids of the predatory calanoid copepod *Euchaeta antarctica* were counted from southern ocean Atlantic sector trawl samples collected during 9 months over a 5-year period. The proportion of CVI males to all CVI animals reached a maximum in June; the proportion of CVI males to total males reached a maximum in July. Two morphologically distinct kinds of spermatophores were attached to 2 different areas on the genital segment of females, and were correlated with 2 kinds of spermatophores held in leg 5 and contained within the bursa of different males. Possible adaptive significance of spermatophore dimorphism and placement for Euchaetidae is discussed and further studies are outlined. (Auth.)

B-36309
Cuzin-Roudy, J., **Sexual differentiation in the antarctic krill *Euphausia superba* Dana (Crustacea:Euphausiacea),** *Journal of crustacean biology,* Aug. 1987 7(3), p.518-524, With French summary. 24 refs.

Young krill (late larvae, juveniles, and subadults) were sampled from the region of Prydz Bay, Antarctica, in Jan.-Feb. 1985, and were observed alive to determine body size, molt stage, and external sexual features. The gonads were subsequently fixed and studied histologically. The undifferentiated gonad contains primary and secondary gonia. Secondary gonia first differentiated into oocytes in young krill at a body length of 24 mm. Maturation of the ovary or testis and development of secondary sexual characters (petasmata and ampullae in males; thelycum in females) occurred during a phase defined as subadult. The ovary became fully mature and spawning occurred in young females at body size of 33 mm. The smallest mature male was 36 mm long. By differentiating the gonad before the external sexual features, *Euphausia superba* follows the same developmental pathway as peracarid crustaceans. However, krill are adapted to the antarctic environment in being able to regress in sexual maturity and in size under extreme winter conditions. The possibility of a sexual regression to an immature or even an undifferentiated state is discussed. (Auth.)

B-36315
Hamner, W.M., **Physiological and ecological correlates of temporally limited resources in the polar regions,** Comparative physiology: life in water and on land. Edited by P. Dejours, L. Bolis, C.R. Taylor, and E.R. Weibel. Fidia research series, Vol.9, Padova, Liviana Press, 1987, p.447-457, Refs. p.455-457.

The short pulse of primary production in polar regions is followed by a disproportionately long period when energy is unavailable. Phyletically diverse animals that depend on seasonally available resources have converged on a limited number of physiological, morphological, and behavioral adaptations to this cycle. Topographic and oceanographic features of each polar region have strongly influenced specific adaptations to polar climates. (Auth.)

B-36319

Kottmeier, S.T., Sullivan, C.W., **Late winter primary production and bacterial production in sea ice and seawater west of the Antarctic Peninsula,** *Marine ecology progress series,* Mar. 1987 36(3), p.287-298, 71 refs.

The southern ocean is believed to be unproductive during winter due principally to low irradiance. On the 1985 Wintercruise of the R/V *Polar Duke,* considerable microbial biomass and rates of primary production and bacterial production were found in sea ice up to 1.79 m thick. Microbial activity associated with sea ice was equal to that found in several meters of underlying seawater. Downwelling irradiance was adequate for net production near the surface of ice-free water and in sea ice. Approximately 40% of the newly fixed carbon incorporated by ice microalgae was assimilated into protein, suggesting that net growth was taking place without nutrient limitation. It is proposed that annual estimates of primary production should be revised upward by as much as 25% to account for this unexpected productivity during late winter in the southern ocean. In addition, sea ice should be viewed as a concentrated source of microalgal carbon for grazers such as krill during late winter when phytoplankton in the water column are scarce. *In situ* observations suggest that sea ice may also serve as an important nursery ground for larval krill during this time of year. It is concluded that both the quantity of sea ice associated production and seasonal timing of this production are important factors in antarctic trophodynamics. (Auth.)

B-36325

Wada, E., Terazaki, M., Kabaya, Y., Nemoto, T., **N-15 and C-13 abundances in the antarctic ocean with emphasis on the biogeochemical structure of the food web,** *Deep-sea research,* 1987 34(5/6A), p.829-841, Refs. p.839-841.

Distribution of delta N-15 and delta C-13 for biogenic substances in the antarctic ocean were investigated to construct a biogeochemcial framework for assessing the antarctic ecosystem. Phytoplankton exhibited particularly low delta N-15 (0.5 per mill) and C-13 (-26.9 per mill) values in pelagic plankton samples. High nitrate concentrations, and high PCO2 in the surface waters on the southern side of the polar front and the resulting slow growth rate of phytoplankton under low light intensity are suggested as possible factors in causing the low isotopic compositions. Mean fractionation factors of 1.029 and 1.006 were estimated for photosynthetic carbon fixation and for the assimilation of inorganic nitrogenous compounds (ammonium plus nitrate) during algal growth, respectively. Particles collected by sediment traps gave characteristically low delta N-15 values (-3.0 to 0.9 per mill), strongly suggesting a phytoplankton origin. The delta N-15 and delta C-13 values of settling material showed similar vertical profiles with depth which might arise from temporal variation of algal growth. (Auth. mod.)

B-36328

Hall, A.J., **Breeding biology of the white-chinned petrel *Procellaria aequinoctialis* at South Georgia,** *Journal of zoology,* Aug. 1987 212(4), p.605-617, 26 refs.

Aspects of the breeding biology of the white-chinned petrel *Procellaria aequinoctialis* were studied at South Georgia. Laying, hatching and fledging dates, together with egg and adult measurements, rate of weight loss of eggs and incubating adults and data on the duration of incubation shifts were recorded. Chick growth in weight, tarsus length, culmen length and wing length from hatching to fledging was followed in detail and breeding success and causes of mortality documented. Comparisons are made with other populations of the species, other members of the genus *Procellaria* and other Procellariiformes. Despite being the largest burrow-nesting petrel in the world, *P. aequinoctialis* conforms well to the overall relationships between body weight and breeding parameters for Procellariiformes in general. (Auth.)

B-36329

Grobler, D.C., Toerien, D.F., Smith, V.R., **Bacterial activity in soils of a subantarctic island,** *Soil biology and biochemistry,* 1987 19(5), p.485-490, 18 refs.

Heterotrophic bacterial activities in the soils from 5 habitats on subantarctic Marion I. were estimated by a kinetic method for glucose mineralization and by a dehydrogenase assay. However, the two methods resulted in fairly similar inter-site patterns of relative activities. On a specific activity basis (i.e. activity per bacterial cell) values by the glucose mineralization procedure decreased across sites in the order albatross nest site > medium-altitude fjaeldmark > low-altitude fjaeldmark > fernbrake > mire. Based on dehydrogenase activity the order was albatross nest site > fernbrake > medium-altitude fjaeldmark > low-altitude fjaeldmark > mire. These patterns are discussed in the context of information on the numbers, biovolumes, morphologies and fluorescence characteristics of the bacteria at the various sites. (Auth.)

B-36331

Rawlence, D.J., Ensor, P.H., Knox, G.A., **Summer tide-crack phytoplankton at White Island, McMurdo Sound, Antarctica,** *New Zealand journal of marine and freshwater research,* 1987 21(1), p.91-97, 29 refs.

The standing crop and succession of marine microalgae are described for blooms in the surface water of a tide crack in the permanent ice of the Ross Ice Shelf at White Island, McMurdo Sound. The dominant microalgae during late Nov. were Chlorophyta *(Pyramimonas* sp.). Bacillariophyceae (diatoms) were dominant from early Dec. until the end of the study in late Jan. Five species were most abundant: *Nitzschia cylindrus, Nitzschia curta, Nitzschia obliquecostata, Fragilaria* Sp., and *Synedra tabulata.* The concentration of chlorophyll *a* was at the highest level when *Pyramimonas* sp. were most abundant. Incident light and the percentage transmission of light to a depth of 1 m in the tide crack were also at maximum levels at this time. The chlorophyll *a* concentration decreased to below the limits of detection after the thaw in mid-Jan. when there was an abrupt increase in the temperature and a decrease in the salinity of the surface waters in the tide crack. The concentration of dissolved oxygen was at a maximum when the diatoms were most abundant. (Auth.)

B-36338

Hecht, T., **Guide to the otoliths of southern ocean fishes,** *South African journal of antarctic research,* 1987 17(1), p.1-87, With Afrikaans summary. 58 refs.

This study is a contribution to the ichthyology and in particular to the study of predator/prey interrelationships in the southern ocean. The otoliths of 120 species, known to occur in the region, are described and illustrated. Synoptic notes on the diagnostic features, intraspecific morphological variation and ontogenetic development are provided. Whenever possible, the relationships between otolith length and fish length as well as between fish length and mass are also presented. A key to the otoliths, based primarily on geometric shape, is developed to facilitate the identification of otoliths found in predator stomachs. (Auth.)

B-36344

El-Sayed, S.Z., ed, **Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS newsletter, Vol.9, No.1,** College Station, Texas A and M University, July 1987, 16p.

Discussions at the Fifth Session of the IOC Regional Committee for the Southern Ocean, held on June 9-12, 1987, in Paris, are summarized. Material covered includes intersessional activities, scientific research conducted in the southern ocean since the Fourth Session of the Committee in 1983, preparation of research projects for future international cooperation, and recommendations on future research

related to the study of general circulation of the southern ocean. Activities of the BIOMASS Executive Council meeting, held on June 1, 1987, Paris, and of the Scientific Seminar on Antarctic Ocean Variability and Its Influence on Marine Living Resources, Particularly Krill, held on June 2-6, 1987, also in Paris, are reviewed, as are activities of the Physical Oceanographic Workshop, held in two parts on Mar. 9-20 and 23-27, 1987, in Cambridge, U.K. The 3 Legs of the European *Polarstern* Study, which will address various aspects of antarctic ecology in the Antarctic Peninsula and the Weddell Sea in Oct. 1988-Mar. 1989, are outlined. New available BIOMASS publications are listed; various news items, dealing with BIOMASS Data Centre, administrative changes, and Polish, Italian and Norwegian expeditions, are included.

B-36361

Mariño, J., **Preliminary study of the biomass and phytoplankton composition in the Scotia Sea and the South Shetland Islands** [Estudio preliminar de la Biomasa y composición del fitoplancton en el mar de Escocia e islas Shetland del Sur], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.69-77, 18 refs., In Spanish with English summary.

In the *Antártida 8611* expedition to the Scotia Sea and South Shetland Is. during the austral summer of 1986-87, the phytoplankton composition and the chlorophyll *a* concentration, as measured by continuous *in vivo* fluorescence record at 3.5 m depth, were studied. In the South Georgia area, chlorophyll *a* ranged from 0.3 to 5.0 mg/cu m. *Chaetoceros sociale* and *Thalassiosira* were the main phytoplankton species. At the Sandwich Is. chlorophyll ranged from 0.2 to 0.5 mg/cu m in the north, and from 0.8 to 2.5 mg/cu m in the south due to a *Th. subtilis* and *Phaeocystis pouchetti* bloom. At the Orkney Is., the biggest concentrations of chlorophyll *a* was registered, with 11.2 mg/cu m maximum due to a multispecific bloom. In the Shetland Is. area, including the Bransfield Strait, chlorophyll *a* ranged from 0.1 to 1 mg/cu m, with the exception of two blooms, one near Deception I. and the other in the northern end of the Strait, with 5.1 and 3.2 mg/cu m maximum, respectively. *Corethron criophilum* was the main species. (Auth.)

B-36363

Darías, J., Rovirosa, J., San Martín, A., **Chemical and taxonomic study of antarctic organisms** [Estudio quimiotaxonómico de organismos de la Antártida], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.89-98, 13 refs., In Spanish with English summary.

The chemical study of the red alga *Plocamium cartilagineum,* collected in the Antarctic Peninsula and King George I, yielded plocamene-D, epiplocamene-D and a new acyclic halogenated monoterpene 4, the structure of which has been elucidated by spectroscopic means. A biogenetic route for 4 is proposed. (Auth.)

B-36378

Rucabado, J., Lloris, D., **Contribution of Magellanic ichthyofauna to populations in antarctic waters** [Contribución de la ictiofauna magellánica al poblamiento de las aguas antárticas], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.251-256, 6 refs., In Spanish with English summary.

The findings of a sampling expedition in the Beagle Channel (Tierra del Fuego) are compared with the ichthyofauna of the Magellanic province. The high endemic species ratio, and the great number of antarctic species found, lead to the consideration of the southern channels of Chile/Argentina as centers of speciation and dispersion to subantarctic and antarctic environments. (Auth. mod.)

B-36379

Sobrino, I. de, Giraldez, A., Millán, M., **Discards from commercial fishing of krill found during the *Antártida 8611* cruise** [Descartes en la pesca comercial de krill *(Euphausia sp.),* obtenidos durante la campaña *Antártida 8611*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.257-268, 5 refs., In Spanish with English summary.

Statistical analyses are presented of fish and cephalopods caught in krill trawls with the object of determining the relationship between these by-catches and other fish stocks as a basis for evaluation of antarctic fishing resources. Although results show only a 0.03% of other-than-krill captured, the by-catches consisted mostly of undersized, immature individuals, supporting the thesis of these and other investigators of the negative consequences of intensive fishing of krill.

B-36380

Macpherson, E., **Distribution and biogeography of crustacean decapods in antarctic waters** [Distribución y biogeografía de crustáceos decápodos en aguas Antárticas], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.269-283, 34 refs., In Spanish with English summary.

The hydrographic characteristics of the antarctic ocean seem to indicate the existence of well marked biogeographic boundaries that condition the existence of an antarctic fauna more or less isolated from the rest of the limiting oceans. There is a clear relationship between the different water masses and the different groups of species. Among the benthic species there are two clearly differentiated geographic groups: one, associated to the deep coastal water (15-3500 m) would be formed by exclusively antarctic species *(Notocrangon antarcticus, Chorismus antarcticus, Lebbeus antarcticus, Nematocarcinus laenceopes* and *Paralomis birshteini);* the second group, associated to the Polar Front, would be formed by species whose area of distribution is extended towards the north, in depths greater than 400 m *(Neolithodes diomedeae, Paralomis spinossissima* and *Paralomis formosa.* The pelagic species present a wide distribution, being found both north and south of the Antarctic Polar Front. (Auth.)

B-36381
Balguerías, E., Bruno, J., Daroca, E., Quintero, M.E., **Biomass estimate of some species captured during the *Antártida 8611* cruise** [Estimación de la biomasa de algunas especies capturadas durante la campaña *Antártida 8611*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.285-307, 17 refs., In Spanish with English summary.

The stock size of 7 *Nototheniidae* and 4 *Channichthyidae* was estimated by the swept area method (Saville, 1978). The area of study was extended to the continental shelf of the archipelagos in the Scotia Arc up to 500 m deep. A decrease in the global biomass was detected with the increase of latitude. The layer between 150-250 m of water was the most heavily populated. *Champsocephalus gunnari* Lönnberg, 1905, was the most abundant species in the region, found in great numbers around Shag Rocks and South Georgia. (Auth. mod.)

B-36382
Balguerías, E., Martínez, J., Otero, R., Piñeiro, C.G., **Selection parameters for *Notothenia gibberifrons* Lönnberg 1905 and *Champsocephalus gunnari* Lönnberg 1905 obtained during the *Antártida 8611* cruise** [Parámetros de selección obtenidos para *Notothenia gibberifrons* Lönnberg, 1905 y *Champsocephalus gunnari* Lönnberg, 1905, durante la campaña *Antártida 8611*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.309-323, 10 refs., In Spanish with English summary.

Mesh selectivity experiments for 10 finfish species were conducted during the Spanish antarctic cruise *Antártida 8611* using the covered cod-end technique. This paper presents the preliminary results obtained for *Notothenia gibberifrons* and *Champsocephalus gunnari*. Selection factors calculated following different methods with a cod-end mesh of 68 mm were 2.87 for *Notothenia gibberifrons* and 3.10 for *Champsocephalus gunnari*. (Auth.)

B-36384
Gili, G.M., Pagès, F., **Siphonophores collected in antarctic waters by the *Magga Dan* expedition (1966-1967)** [Sifonoforos recolectados en aguas antárticas por la expedición *Magga Dan* (1966-1967)], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.343-351, 17 refs., In Spanish with English summary.

Nine species of siphonophores were collected during the *Magga Dan* cruise carried out in antarctic and subantarctic waters between Dec. 1966 and Jan. 1967. Four species are recorded for the first time in this zone: *Bargmannia elongata, Nanomia bijuga, Eudoxoides spiralis* and *Lensia lelouveteau*. (Auth.)

B-36385
Ramos, A., Sobrino, I., Gil de Sola, L., Piñeiro, C.G., **Macrobenthos of the Scotia Arc archipelago found during the *Antártida 8611* cruise** [Un examen general del macrobentos de los Archipiélagos del arco de Escocia, encontrados durante la campaña *Antártida 8611*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.353-365, 5 refs., In Spanish with English summary.

The principal groups of invertebrates and algae appearing in 345 bottom trawls realized during the oceanographic cruise *Antártida 8611* are analyzed in relation to geographical areas, depth and the seabottom type. Preliminary data of biomass and the cartographic distribution of some groups are also presented. (Auth.)

B-36386
Uriz, M.J., **Current knowledge about antarctic sponges. Faunal peculiarities and topics for research** [Estado actual del conocimiento de las esponjas antárticas. Peculiaridades faunísticas y temas de interés en investigación], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.365-374, 24 refs., In Spanish with English summary.

Sponges are one of the invertebrate groups most representative of the antarctic benthos. The principal aspects characterizing them are: their extraordinary abundance, their steady latitudinal and bathymetric distribution, the predominance of forms rich in silica (Hexantinellida), the large size of the demosponges spicules and the scarcity of calcareous sponges. In spite of the presence of an original fauna with a high percentage of endemicity, a definite number of species is located north of the Antarctic Convergence. (Auth.)

B-36387
Alonso, J.C., **Birds of Scullin Monolith, East Antarctica (67 deg 47'S, 66 deg 42'E)** [Las aves del monolito Scullin, Antártida oriental (67 deg 47'S, 66 deg 42'E)], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.375-386, 13 refs., In Spanish with English summary.

The seabird colonies at Scullin and Murray Monoliths, East Antarctica, were censused and mapped during voyage 6 of ANARE 1986-87. Total breeding populations were estimated at 49,500 Adélie penguin pairs, 157,000 antarctic Petrel pairs, 1,350 Southern Fulmar pairs, 1200 Snow Petrel pairs, 14 Cape Petrel pairs, 30 South Polar Skua pairs, and an unknown number of Wilson's Storm Petrels on Scullin. On Murray, the only estimations were 20,000 Adélie penguin pairs, 3,500 antarctic Petrel pairs, and 150 Southern Fulmar pairs. No colonies were found at Neill Peak. The average nest density for the antarctic Petrel at Scullin was 0.82 nests/sq m, with a breeding success of 77%. Values for the previous 3 seasons were clearly lower. (Auth.)

B-36388
Sancho, L.G., **Catalog of lichens from material collected on South Shetland Islands during the *Antartic-86* expedition** [Catálogo liquénico del material recolectado en las islas Shetland del Sur por la expedición *Antartic-86*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.387-397, 16 refs., In Spanish with English summary.

The results of the determination of 150 lichen samples, from South Shetland Is., are presented. These samples were collected by the Spanish expedition *Antartic-86*. Thirty-two taxa, 12 of them endemic to the maritime Antarctic, are reported. Their ecology and their distribution known in the Antarctic and all over the world is given. Some problematic taxa are also reported with their original descriptions. (Auth.)

B-36396
Bosch, I., Beauchamp, K.A., Steele, M.E., Pearse, J.S., **Development, metamorphosis, and seasonal abundance of embryos and larvae of the antarctic sea urchin *Sterechinus neumayeri*,** *Biological bulletin,* Aug. 1987 173(1), p.126-135, Refs. p.134-135.

The development to metamorphosis of the shallow-water antarctic sea urchin, *Sterechinus neumayeri,* is described for the first time. Hatching of ciliated blastulae occurs approximately 140, 128, and 110 hours after fertilization at -1.8, -1.0, and -0.5 C, respectively. Larvae reared at -1.8 to -0.9 C are capable of feeding 20 days after fertilization and are competent to metamorphose after 115 days. Early cleavage embryos, blastulae, gastrulae, and prism larvae of this species were collected from the plankton adjacent to McMurdo Station in early Nov. and Dec. 1984 and 1985. The timing of spawning ensures that feeding larvae are in the plankton during the abbreviated summer peak of phytoplankton abundance in McMurdo Sound. Recruitment of juveniles into the benthos most likely occurs in synchrony with the subsequent period of high levels of benthic chlorophyll *a* concentrations. (Auth. mod.)

B-36397
Alexander, S.P., DeLaca, T.E., **Feeding adaptations of the foraminiferan *Cibicides refulgens* living epizoically and parasitically on the antarctic scallop *Adamussium colbecki*** , *Biological bulletin,* Aug. 1987 173(1), p.136-159, Refs. p.158-159.

The calcareous foraminifer *Cibicides refulgens* is a conspicuous and abundant component of the epifaunal community living on the valves of the free-swimming antarctic scallop, *Adamussium colbecki.* Examination of this association demonstrates that the foraminifer possesses a combination of morphological and physiological adaptations, unique among benthic calcareous foraminifera, which enhance its ability to acquire nutrients in an otherwise oligotrophic and seasonal environment. Three distinct modes of nutrition are employed: grazing the algae and bacteria living upon the scallop shell surface, suspension feeding through the use of a pseudopodial net deployed from a unique superstructure of agglutinated tubes which form an extension to the calcareous test, and parasitism by eroding through the scallop's shell, and using free amino acids from the highly concentrated pool in the extrapallial cavity. (Auth. mod.)

B-36399
McGuire, A.J., Franzmann, P.D., McMeekin, T.A., ***Flectobacillus glomeratus* sp. nov., a curved, nonmotile, pigmented bacterium isolated from antarctic marine environments,** *Systematic and applied microbiology,* 1987 9(3), p.265-272, Refs. p.271-272.

A new species of the genus *Flectobacillus, Flectobacillus glomeratus,* is described from antarctic marine environments. Strain ACAM 171 was isolated from Burton Lake. Another strain, ACAM 111, was isolated from surface seawater collected in Prydz Bay. Cells of the strains are vibrioid to highly coiled. Cells of similar morphology were located in these environments by fluorescence microscopy. The cells are Gram-negative, nonmotile and become coccoid in old or aging cultures. The strains do not produce acids from carbohydrates or alcohols and do not grow on organic acids or alcohols as sole sources of carbon. They are obligate aerobes and require seawater or marine salts for good growth. ACAM 171 is psychrophilic and ACAM 111 is psychrotrophic. The strains contain pigments, either yellow or tan, which are not flexirubins. The G+C content of their DNA is 33.0 and 33.2 mol%. The type strain is UQM 3055 (ACAM 171). (Auth.)

B-36400
Ellingsen, T.E., Mohr, V., **Biochemistry of the autolytic processes in antarctic krill *Post mortem*,** *Biochemical journal,* Sep. 1, 1987 246(2), p.295-305, 22 refs.

Autoproteolysis *Post mortem* was examined at 0 C by following the changes in the major classes of krill *(Euphausia superba* and *Euphausia crystallorophias)* proteins and by liberation of peptides and free amino acids. Primarily salt-soluble proteins were broken down during the first week of incubation, whereas water-soluble and insoluble proteins were degraded to a much smaller extent. In general, the individual amino acids were released at rates corresponding to their relative occurrence in the bulk protein of the krill. Alanine was liberated in larger amounts than would be expected from the composition of the krill protein. Glutamic acid, and certain amino acids were liberated only to a limited extent, and accumulated in smaller peptides. During proteolysis, arginine seemed to be converted to some degree into ornithine, and on prolonged incubation conversion of arginine and lysine into their corresponding decarboxylation products, agmatine and cadaverine, appeared to take place. (Auth. mod.)

B-36401
Ridoux, V., **Feeding association between seabirds and killer whales, *Orcinus orca,* around subantarctic Crozet Islands,** *Canadian journal of zoology,* Aug. 1987 65(8), p.2113-2115, 10 refs.

Twenty-nine observations of killer whale *(Orcinus orca)* pods and associated bird flocks were made from Mar. 1982 to Feb. 1983 from the coast of Possession I. Coastal foraging birds, such as giant petrels *(Macronectes sp.),* Cape pigeon *(Daption capense),* and kelp gull *(Larus dominicanus),* are more often associated with feeding pods than with nonfeeding ones, while pelagic species like the white-chinned petrel *(Procellaria aequinoctialis)* may deliberately follow the whales and wait for floating offal. The black-browed albatross *(Diomedea melanophrys),* which is somewhat intermediate between coastal and pelagic birds, shows components of both strategies. (Auth.)

B-36426
Hill, R.D., **Heart rate and body temperature during free diving of Weddell seals,** *American journal of physiology,* Aug. 1987 253(2), p.R344-R351, 15 refs.

The first microprocessor-controlled monitor for collection of data on depth, heart rate, and body temperature was developed and successfully used on one fetal and five adult male freely swimming Weddell seals. Adult seals almost invariably experienced a prompt brady-

cardia at the start of each dive, and the mean heart rate during diving was significantly lower for dives >20 min (P>0.999). The heart rate was also significantly greater during the ascent portion of dives when compared with the descent portion (P>0.95). The fetal seal experienced a slow onset of bradycardia when its mother dived; during diving the fetal heart rate decreased by an average of 1.1 beats/min for each minute of the dive. The fetal heart rate generally took about 10 min to recover to predive levels after its mother resurfaced to breathe. The body temperature of one adult male Weddell seal showed a decrease of >1.5 C from resting levels before dives of >15 min were initiated and a drop of over 2 C before dives of >30 min duration. (Auth.)

B-36447

Marchant, H.J., Seppelt, R., Doig, F., **Iced with life,** *Australian natural history,* Summer 1986-87 22(3), p.102-109.

A general overview is given of the antarctic continent which has, in spite of being a vast desert, a surprising richness of marine and terrestrial life. The terrestrials consist mostly of rock- and snow-living creatures such as algae, fungi, lichens, and bryophytes and one grass on the northern end of the Antarctic Peninsula. The marines are basically plankton which are food for krill which in turn provide food for the rest of the marine life and for the transitionals: the seals and penguins. All, marines and terrestrials alike, have made numerous adaptations over the millennia to survive the rigorous antarctic climate.

B-36451

Rivkin, R.B., Putt, M., **Photosynthesis and cell division by antarctic microalgae: comparison of benthic, planktonic and ice algae,** *Journal of phycology,* June 1987 23(2), p.223-229, 52 refs.

Irradiance-dependent rates of photosynthesis and cell division of 6 species of microalgae isolated from the benthos, plankton and sea ice microbial community in McMurdo Sound were compared. Microalgae isolated from different photic environments had distinct photosynthetic and growth characteristics. The slope of the light-limited portion of the P-I relationship was up to 50 times greater for the benthic algae than for either the ice or planktonic algae suggesting that benthic algae used the low irradiances more efficiently for carbon uptake. Cell division was dependent on the incubation irradiance for all but one microalga examined. The dependence of division rates on irradiance was however much smaller than for carbon uptake, suggesting that cell division buffers the influence of short term variations of irradiance on cellular metabolism. (Auth.)

B-36452

Booth, B.C., Marchant, H.J., **Parmales, a new order of marine chrysophytes, with descriptions of three new genera and seven new species,** *Journal of phycology,* June 1987 23(2), p.245-260, 14 refs.

A new order, Parmales, in the Chrysophyceae has cells with siliceous walls made up of round, triradiate and sometimes oblong plates all fitting edge to edge. In the new family, Octolaminaceae, cell walls have eight plates. Cell walls in the new genus *Tetraparma* have four round plates and four triradiate plates. Cell walls in the new genus *Triparma* have three round plates of equal size, one larger round plate, one triradiate plate and three oblong plates. In the new family, Pentalaminaceae, cell walls have three round and two triradiate plates. A total of seven new species and four subspecies are described from subarctic Pacific and antarctic waters. (Auth.)

B-36454

Pankow, H., Haendel, D., Richter, W., Wand, U., **Algological studies in the Schirmacher and Untersee Oases (Queen Maud Land, East Antarctica)** [Algologische Beobachtungen in der Schirmacher- und Unterseeoase (Dronning Maud Land, Ostantarktika)], *Archiv für Protistenkunde,* 1987 134(1), p.59-82, In German with English and Russian summary. Refs. p.77-82.

Algological studies on various samples such as algal mats or felts, phytoplankton from freshwater lakes, soils, lake sediments, lichens and mosses collected on the antarctic continent were carried out. Altogether 72 taxa of algae were identified, among them 61 taxa the occurrence of which, in the study area, is reported for the first time. The paper includes the first report on the algal flora of Lake Unter-See; the occurrence of 26 algal taxa was observed, among them 12 species not found in Schirmacher Pond. At present, the total number of algal taxa occurring in both lakes amounts to 130. The determination of further species is expected through a more comprehensive and systematic sampling. (Auth.)

B-36455

Mendoza, M.L., Cabioch, J., **Genus *Hydrolithon* (Rhodophyta, Corallinaceae) on Argentine subantarctic and antarctic coasts and neighboring areas** [Le genre *Hydrolithon* (Rhodophyta, Corallinaceae) sur les côtes subantarctiques et antarctiques d'Argentine et de quelques régions voisines], *Cahiers de biologie marine,* 1986 27(2), p.163-191, In French with English and Spanish summaries. Refs. p.190-191.

The genus *Hydrolithon* formerly known as a tropical entity is well diversified in the subantarctic and antarctic zones with 5 species: *H. consociatum,* (Foslie) Mendoza, *H. decipiens,* (Foslie) Adey, *H. discoideum* (Foslie) Mendoza et Cabioch, *H. falklandicum* (Foslie) Mendoza and *H. subantarcticum* (Foslie) Mendoza et Cabioch. The type-specimens preserved in the Foslie collection (TRH) have been studied and the 5 species are newly defined on the basis of their morphogenetical, cytological and reproductive characters. The general features of the vertical distribution of the 5 species in the intertidal zone are given. The persistence of the same succession of permanently immerged species in tidal pools suggests the predominance of light as an ecological factor for these algae. The general pattern of their geographical distribution is also proposed. (Auth. mod.)

B-36456

Ochyra, R., Ochi, H., **New or otherwise interesting species of the genus *Bryum* (Musci, Bryaceae) in the Antarctic,** *Acta botanica Hungarica,* 1986 32(1-4), p.209-219, 20 refs.

Bryum urbanskyi Broth. in Dryg. and *B. orbiculatifolium* Card. et Broth. are reported for the first time from the antarctic botanical zone. Descriptions and illustrations of antarctic material of both species are provided, together with brief notes on their ecology, taxonomy and distribution. *B. amblyodon* C. Muell., previously known only from the Melchior Archipelago, near the Antarctic Peninsula, as *B. inclinatum* (Brid.) Bland. var. *magellanicum* Card., is reported for the first time from King George I. A description, illustrations and notes on ecology, taxonomy and distribution are given for this species including an antarctic distribution map. *B. imperfectum* Card. and *B. inclinatum* (Brid.) Bland. var. *magellanicum* Card. are reduced to synonymy with *B. amblyodon* C. Muell. (Auth.)

B-36457

Rivkin, R.B., Putt, M., **Heterotrophy and photoheterotrophy by antarctic microalgae: light-dependent incorporation of amino acids and glucose,** *Journal of phycology,* Sep. 1987 23(3), p.442-452, Refs. p.450-452.

Diatoms isolated from the benthic, planktonic and sea ice microbial communities in McMurdo Sound assimilated ambient concentrations of dissolved amino acids and glucose in both the light and dark. Uptake of amino acids but not glucose was influenced by the incubation irradiance and amino acid uptake rates were up to 250 times greater than those of glucose. Amino acids were incorporated into proteins and other complex polymers and the rates of assimilation and patterns of polymer synthesis were similar to those of the light-saturated photosynthetic incorporation of inorganic carbon. This suggests that these diatoms can use exogenous amino acids to synthesize the essential macromolecules for heterotrophic growth. The assimilation of dissolved organic substrates could supplement light-limited growth during the austral spring and summer as well as potentially support the heterotrophic growth of these diatoms throughout the aphotic polar winter. (Auth.)

B-36458

Adams, N.J., **Foraging range of King penguins *Aptenodytes patagonicus* during summer at Marion Island,** *Journal of zoology,* July 1987 212(3), p.475-482, 16 refs.

Foraging ranges of King penguins *Aptenodytes patagonicus* were estimated by combining information on the feeding rates to chicks and brood shift lengths of adults with measurements of travelling speeds and activity budgets at sea. Adults brooding small chicks were relieved on average every 13 days and large chicks were fed every four days. Adults with large chicks spent 36% of their time, between attachment of the device and recapture, travelling at an average speed of 8.7 km/h. This gives an estimated mean maximum foraging range of about 300 km. Adults attending small chicks spent 19% of their time away swimming, giving an estimated mean maximum foraging range fo 225 km. Extreme foraging ranges for all birds were 75 and 902 km for penguins returning between two and 24 days at sea, respectively. Total distance travelled was highly correlated with time away from the colony. (Auth.)

B-36459

Stubblefield, S.P., Taylor, T.N., Trappe, J.M., **Fossil mycorrhizae: a case for symbiosis,** *Science,* July 3, 1987 237(4810), p.59-60, 9 refs.

Vesicular-arbuscular mycorrhizae are significant in the physiology and ecology of extant vascular plants, and they may also have played a major role in the origin of the vascular land flora. The case for fossil vesicular-arbuscular mycorrhizae rests upon hyphae and chlamydospore-like bodies in several Paleozoic taxa, but fossil arbuscles are unknown to date. Specimens from the Triassic of Antarctica represent the first known occurrence of arbuscles in the fossil record. (Auth.)

B-36460

Feldmann, R.M., **Paleobiogeography of two decapod crustacean taxa in the Southern Hemisphere: global conclusions with sparse data,** Crustacean biogeography, edited by R.H. Gore and K.L. Heck. Crustacean issues, No.4, Rotterdam, Balkema, 1986, p.5-19, 35 refs.

Examination of the fossil record of two decapod crustacean groups, the Aeglidae and the raninid genus *Lyreidus,* shows that they originated in the southern circum-Pacific region in Late Cretaceous and Eocene time, respectively, and that dispersal into lower latitudes probably occurred in the early Oligocene. Fragmentation of the southern Pacific landmass, dominated by Antarctica and Australia, and concomitant development of the Circum-Antarctic Current system severely reduced the probability of further dispersals along this route. These interpretations, based on extremely limited fossil data, parallel conclusions drawn regarding the paleobiogeographic distribution of mollusks in the early Tertiary Weddellian Province.

B-36461

Sieg, J., **Distribution of the Tanaidacea: synopsis of the known data and suggestions on possible distribution patterns,** Crustacean biogeography, edited by R.H. Gore and K.L. Heck. Crustacean issues No.4, Rotterdam, Balkema, 1986, p.165-194, Refs. p.193-194.

Within faunistics, an overview of the established zoogeography regions is given. The tanaidacean fauna of the main regions (cold water areas of the Antarctic and Arctic, northern and southern temperate waters, tropical warm water) are discussed. The antarctic cold water area is characterized by having much higher percentage of endemic elements (approximately 63%) than the Arctic (about 10%). There are only two or three species in these regions that show a bipolar distribution. Only a limited comparison of the tanaidacean faunas of the northern temperate and tropical warm water areas is made. The Atlantic tanaidacean fauna shows a closer relationship to the Pacific than to the Indian ocean. The shallow-water family Tanaidae probably has a southern 'evolution center'. It is then shown that the phylogenetic method also allows an analysis of the geographic origin of the members of a special fauna. The relationship between body size and depth is discussed. An analysis shows that the order Tanaidacea is characterized by a constant size reduction during evolution. Therefore, there is a much stronger correlation between size and the phylogenetic age of a taxon than with depth. Probably all known large deep-sea or cold water species of a particular taxon are plesiomorphic compared to the small members occurring in the same region. (Auth. mod.)

B-36467

Gamundi, I.J., Spinedi, H.A., ***Sclerotinia antarctica* sp. nov., the teleomorph of the first fungus described from Antarctica,** *Mycotaxon,* July-Sep. 1987 Vol.29, p.81-89, 14 refs.

The finding of *Sclerotium antarcticum* Bommer and Rousseau on leaves of *Deschampsia antarctica*--and apothecia of the Sclerotinia type arising from free sclerotia—found on the Danco Coast in Jan.-Feb. 1986, is reported. Morphological, taxonomic and ecological features, and the treatment of sclerotia, are discussed.

B-36469

Ensor, P.H., Bassett, J.A., **Breeding status of Adélie penguins and other birds on the coast of George V Land, Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* July 1987 No.50, 16p., 3 refs.

A census by counts and estimates of Adélie penguin chicks on the George V Coast between Commonwealth Bay and Buchanan Bay was undertaken during Jan. 1982. Sections of colonies were photographed for comparison with photographs taken in 1913 during the Australasian Antarctic Expedition; positions and sizes of sub-colonies appeared unchanged after an interval of 68 years. Observations on the distribution of breeding antarctic fulmars, cape petrels, snow petrels, Wilson's storm-petrels and South polar skuas are presented.

B-36480

Bernhard, J.M., **Foraminiferal biotopes in Explorers Cove, McMurdo Sound, Antarctica,** *Journal of foraminiferal research,* Oct. 1987 17(4), p.286-297, 22 refs.

Benthic foraminifera in Explorers Cove are distributed in 7 biotopes, as distinguished by observations made using SCUBA to depths of 26.8 m. Nearly 30,000 specimens were counted from 74 samples. The biotopes are distinguished on the basis of physical, chemical and biological parameters, such as substrate type and stability, oxygen content, depth and proximity to glacial erratic boulders. Foraminiferal distribution is patchy on the order of centimeters and meters. The predominantly calcareous, boulder biotope possesses the highest

standing stock and total (live + dead) abundance (23.8/cu cm and 79.5/cu cm, respectively). The sponge mat biotope is the only other predominated by calcareous forms, and it exhibits the highest proportion of Miliolidae (4%). The anchor-ice biotope possesses the highest proportion of living benthic foraminifera (60.6%). The standing stock in the anchor-ice biotope was mostly juveniles. A small (40 sq m) seasonally anoxic basin shows a significant increase in standing stock in late austral summer (from 5.8/cu cm in Nov. to 18.9/cu cm in mid-Jan.), when primary productivity is high. (Auth.)

B-36481

Culik, B., **Fluoride excretion in Adélie penguins *(Pygoscelis adeliae)* and Mallard ducks *(Anas platyrynchos)***, *Comparative biochemistry and physiology,* 1987 88A(2), p.229-233, 26 refs.

Chronic F- doses of NaF (40 and 80 mg F-/kg per day) given to Adélie penguins for 6-7 weeks led to a significant increase in F- concentrations of nasal salt secretions with 1.16 and 2.22 microgram F-/g (wet wt) respectively as opposed to 0.66 microgram F-/g in controls. Single oral administration of 6 mg fluoride as NaF to mallard ducks led to increased F- concentrations in the nasal salt secretions, with a mean of 0.67 microgram F-/g as opposed to 0.11 microgram F-/g in controls. In mallard ducks as well as in Adélie penguins the amount of F- excreted via the cloaca was 1,000-10,000 times that excreted via the nasal salt glands. (Auth.)

B-36512

Ahlgren, J.A., **Antifreeze glycopeptides of antarctic fish: comparative aspects of their biochemistry and physiology,** Urbana-Champaign, University of Illinois, 1987, 117p., University Microfilms order No.87-11765, Ph.D. thesis, Refs. p.106-115.

The presence of antifreeze glycopeptides (AFGPs) in the blood of polar fishes allows fish to live in ice-laden seawater at a temperature below what colligative properties would dictate to be the freezing point of their blood. AFGPs are well-characterized from two antarctic species, *Pagothenia borchgrevinki* and *Dissostichus mawsoni.* Eight other species of antarctic fish were examined for AFGPs, and results showed a high degree of similarity of AFGP between species. H-3 AFGP was prepared and injected in the blood of the antarctic nototheniid fish *Trematomus bernacchii,* and the results showed that body fluids which are blood filtrates, including the interstitial fluid of all tissues except brain, contain all AFGPs, while fluids formed by secretory processes lack AFGP and are supercooled at environmental temperatures of -1.9. Skin from the antarctic fish *Gymnodraco acuticeps* was shown to prevent ice propagation into supercooled saline at environmental temperatures, demonstrating the role of extracellular AFGP in the prevention of ice propagation. The amino acid proline, which is present in the peptide portion of all low molecular weight AFGPs examined to date, was shown to enhance the rate of glycosylation by 10-fold of deglycosylated low molecular weight AFGP *in vitro* by comparing the rates of glycosylation of proline-containing and proline-free low molecular weight deglycosylated AFGP.

B-36527

Penguins [Pingüinos], *Antártida,* June 1987 No.15, p.8-17, In Spanish.

The discovery of penguin fossils in various parts of the world is reviewed, and their ontological and symbolic significance is examined. The appearance of the 5 genera and 8 species endemic to the Antarctic and the Subantarctic is described, along with their feeding, breeding and nesting behavior, their peculiar physiology of acclimatization, and their enemies: the leopard seal at sea, the skua preying on chicks and eggs from the air, and man polluting the penguins' environment with pesticides and oil spills.

B-36535

Samyshev, E.Z., **Bacterioplankton of antarctic waters: concentration, production and bacterial destruction,** *Oceanology,* Feb. 1987 26(4), p.508-512, Translated from Okeanologiia. 12 refs.

The bacterioplankton in the photic layer of the Sodruzhestvo Sea area and adjoining waters consists in summer primarily of cocci, with the fractions smaller than 2 micron predominating. The average abundance and biomass of the microorganisms are 427 thousand cells/ml and 438 mg C/sq m, with ranges of 150-1770 thousand cells/ml and 221-1146 mg C/sq m. The average daily production and bacterial destruction increase from 49 and 104 mg C/sq m at the beginning of the growth period to 85 and 180 mg C/sq m in the middle of the period and remain at this level to the end. Despite the low rate of increase (the daily P/B coefficient averages 0.12), because of its high abundance the bacterioplankton in antarctic waters plays a major role in the destruction of organic matter, accounting for 60-85% of the energy consumed by heterotrophs. (Auth.)

B-36537

Cottarelli, V., Baldari, F., **Interstitial Ancorabolidae (Copepoda, Harpacticoida) from Macquarie Island: *Tapholaophontodes remotus* n. sp. and *Algensiella boitanii* n. gen., n. sp.,** *Crustaceana,* July 1987 53(1), p.67-77, 7 refs.

Two new harpacticoids from the littoral subterranean waters of Macquarie I., *Tapholaophontodes remotus* n. sp. and *Algensiella boitani* n. gen., n. sp. , of the family Ancorabolidae, are described. *T. remotus* is similar to *T. rollandi* Soyer. The biogeography of the relationships of the subantarctic forms are discussed.

B-36538

Fedorov, V.V., Balushkin, A.V., Trunov, I.A., **New whalefish species, *Gyrinomimus andriashevi,* sp. nov. (Osteichthyes: Cetomimidae) from the Lazarev Sea (Antarctic),** *Journal of ichthyology,* 1987 27(2), p.47-54, Translated from Voprosy ikhtiologii. 6 refs.

A member of family Cetomimidae was caught in the Lazarev Sea, which is described as a new species—Andriashev's whale-fish, *Gyrinomimus andriashevi.* The new species differs from all other known *Gyrinomimus* species by a larger number of pores in the lateral line and short pectoral fins. It is compared with *G. myersi, G. simplex* and, more completely, with *G. Notius.* It is concluded that fishes of this family are not incidental inhabitants of antarctic waters. (Auth.)

B-36539

Butskaia, N.A., Faleeva, T.I., **Seasonal changes in the gonads and fecundity of antarctic fishes *Trematomus bernacchii, Trematomus hansoni* and *Pagothenia borchgrevinki* (Nototheniidae),** *Journal of ichthyology,* 1987 27(3), p.27-36, Translated from Voprosy ikhtiologii. 10 refs.

The structure and seasonal changes in the male and female gonads of 3 antarctic nototheniid species were studied. Spawning takes place in a single batch, and the spawning periods are different: spring in *Trematomus bernacchii* and *T. hansoni,* and winter in *Pagothenia borchgrevinki.* Spermatogenesis in fishes with short spawning has some unique properties: ooctyes of the trophoplasmic growth period are always present in the ovaries, some of which are separated every year and complete their development toward the spawning period. The characteristics of maturation stages of ovaries, reflecting the specificity of oogenesis and sex cycle were determined. (Auth.)

B-36542
Hochberg, F.G., Jr., Short, R.B., ***Dicyemennea discocephala* sp. n. (Mesozoa: Dicyemidae) in a finned octopod from the Antarctic,** *Journal of parasitology,* Oct. 1983 69(5), p.963-966, 7 refs.

Dicyemennea discocephala sp. n. is described from *Grimpoteuthis glacialis* (Robson, 1930) (Cephalopoda). It is the fifth species of dicyemid to be described from antarctic waters, and the first species to be reported from a finned octopod host. Mature nematogens of *D. discocephala* were stocky, and could be distinguished from all other species in the genus by very large, disc-shaped calottes. The peripheral cell number of vermiform stages was typically 22 or 23. The largest nematogens measured about 1,450 micron. Vermiform embryos lacked an abortive axial cell and reached lengths of 150 to 195 micron at eclosion. (Auth.)

B-36543
Hogans, W.E., **Morphological variation in *Pennella balaenoptera* and *P. filosa* (Copepoda: Pennellidae) with a review of the genus *Pennella* Oken, 1816 parasitic on cetacea,** *Bulletin of marine science,* May 1987 40(3), p.442-453, 15 refs.

Morphological variability in *Pennella balaenoptera* and *P. filosa* was examined. The anterior end of the parasite (cephalothorax, apical papillae and holdfast horns) exhibited the greatest variability between specimens of a single species. The genus *Pennella* from cetaceans was reviewed; five species *(P. antarctica, P. anthonyi, P. cetti, P. charcoti, P. crassicornis)* being synonymized with *P. balaenoptera.* The structure of the first antennae (segment length and thickness) is proposed as a possible useful feature for distinguishing the teleost parasite *P. filosa* from *P. balaenoptera* found on whales. The variability of morphological characters was found to be responsible for the difficulty in differentiating species of *Pennella.* (Auth.)

B-36551
Wright, S.W., Jeffrey, S.W., **Fucoxanthin pigment markers of marine phytoplankton analysed by HPLC and HPTLC,** *Marine ecology progress series,* July 13, 1987 38(3), p.259-266, 35 refs.

High-performance thin-layer chromatography (HPTLC) and high-performance liquid chromatography (HPLC) were used to separate fucoxanthin, 19'-hexanoyloxyfucoxanthin and a 19'-butanoyloxyfucoxanthin-like pigment from algal cultures. *Pavlova lutheri* (Prymnesiophyceae) contained fucoxanthin only, whereas *Emiliania huxleyi, Phaeocystis pouchetii* (Prymnesiophyceae) and *Pelagococcus subviridis* (Chrysophyceae) contained all 3 fucoxanthin pigments in widely different proportions. The 3 pigments, which were also found in phytoplankton samples from antarctic waters, may provide useful markers of phytoplankton in field samples. The HPTLC method provides a rapid screening technique for fucoxanthin pigments, complementing the more powerful but time-consuming HPLC. (Auth.)

B-36552
Smith, V.R., Newton, I.P., **Vesicular-arbuscular mycorrhizas at a subantarctic island,** *Soil biology and biochemistry,* 1986 18(5), p.547-549, 5 refs.

Vesicular-arbuscular mycorrhizal (VAM) infections have been reported for angiosperms from the Falkland Is. and South Georgia, but apparently do not occur at Signy I. The incidence of VAM in 24 of the 32 extant vascular plant species at subantarctic Marion I. is described, with the hope that the finding will stimulate studies of the classification and physiology of the mycorrhizal fungi and their physiological effects on the host plants growing in the rigorous subantarctic environment.

B-36555
Fife, A.J., **Taxonomic and nomenclatural observations on the Funariceae. 4. A review of *Entosthodon laxus* with incidental notes on *E. obtusifolius*,** *Bryologist,* Winter 1986 89(4), p.302-309, 31 refs.

The nomenclatural history of *Entosthodon laxus* (Wils. & Hook. f.) Mitt., described from Kerguelen, is traced. The phytogeographic affinities of this circum-subantarctic-Andean species have been obscured by its repeated description from various portions of its range, which is now shown to include New Zealand, mainland Australia, Tasmania, Macquarie, Kerguelen, Crozet, and Marion islands, Chile, Bolivia, Peru, Ecuador, and Venezuela. Seven heterotypic names, published in *Entosthodon, Funaria,* and *Meesia,* are placed in synonymy with *E. laxus.* Features which distinguish *E. laxus* from *E. gracilis* (in Australasia) and *E. obutusifolius* (in South America) are detailed. The names *E. acutifolius* Hampe ex C. Muell., *E. longisetus* Schimp. in Besch., and *E. longicollis* Mitt. are placed in synonymy with *E. obtusifolius* Hook. f. in Hook. (Auth.)

B-36559
Parker, B.C., Wharton, R.A., Jr., **Physiological ecology of bluegreen algal mats (modern stromatolites) in antarctic oasis lakes,** *Archiv für Hydrobiologie. Supplement,* 1985 71(1-2), Algological studies 38/39, edited by O. Lhotsky, p.331-348, Refs. p.346-348.

DLC QH301.A4932

The only well-documented high latitude habitats of modern stromatolitic algal mats are the freshwater depths of 7 perennially ice-covered lakes of southern Victoria Land. Within these unusual lakes, 5 basic macromorphological types of mats occur and 4 are stromatolitic (three aerobic or oxygenic and one anaerobic or anoxygenic). Variables which control the mat growth rates and forms particularly include photosynthetically available radiation (PhAR), oxygen production and accumulation, calcite formation, and growth or gliding patterns of the predominant algal or microbial species. Estimated production rates of the 5 different mat types based on assumed annual PhAR, measured %PhAR reaching various depths, and estimates of quantum efficiency show a range of more than 3 orders of magnitude and at least partially explain the occurrence and distribution of these algal mats within these lakes. (Auth. mod.)

B-36560
Hindell, M.A., Burton, H.R., **Past and present status of the southern elephant seal (Mirounga leonina) at Macquarie Island,** *Journal of zoology,* Oct. 1987 213(2), p.365-380, Refs. p.378-380.

The southern elephant seal population at Macquarie I. has undergone a serious decline since regular surveys were commenced in 1949. Approximately 2,900 cows and 250 bulls were counted in the isthmus study area during the 1985 breeding season. Comparisons with 20 other counts made in the same area between 1949 and 1984 showed that, although there was considerable fluctuation between the years, the number of seals ashore has dropped at an average rate of 2.1% per year, resulting in a net decrease of approximately 50% for both males and females. This is similar to the ratio of decline of elephant seal populations in the southern Indian Ocean. The census information from all major elephant seal populations was reviewed and it was concluded that there may be a common factor, or group of factors, acting to reduce the Macquarie I. and Indian Ocean populations, while the populations of the South Atlantic seem to be stable. Several potential explanations for these observations are advanced, but it is concluded that a greater knowledge of the ecology of the seals is needed if the declines are to be understood. (Auth.)

B-36561

Bodiou, J.Y., Colomines, J.C., **Harpacticoides (Crustacea, Copepoda) from Crozet Islands. 1. Description of a new species of the genus *Arenopontia* Kunz** [Harpacticoides (Crustacés, Copépodes) des îles Crozet. 1. Description d'une espèce nouvelle du genre *Arenopontia* Kunz], *Vie et milieu,* Mar. 1986 36(1), p.55-64, In French with English summary. Refs. p.63-64.

A new species of Harpacticoid Copepod belonging to the family Cylindropsyllidae, genus *Arenopontia* Kunz, is described on the basis of specimens collected on Crozet Is. The discussion includes a revision and a key of the *Arenopontia* species. The generic characteristics of the Cylindropsyllidae are partially reviewed (about the morphology of P1) and a key of the genera is proposed. (Auth.)

B-36563

Demers, S., Legendre, L., Therriault, J.C., Ingram, R.G., **Biological production at the ice-water ergocline,** *Elsevier oceanography series,* 1986 Vol.42, Marine interfaces ecohydrodynamics, edited by J.C.J. Nihoul, p.31-54, Refs. p.50-54.

The ice-water interface is the site of high microalgal productivity. These microalgae constitute an important part of the productivity of polar seas. The growth of ice microalgae during the spring and perhaps during the autumn extends the short growing season in the water column. Herbivores have been observed to actively feed on the ice microalgae. Sea-ice microalgae respond to variations in salinity (which controls biomass and taxonomic composition in coastal areas influenced by freshwater runoff), temperature (the survival of microalgae depends on their ability to develop a protection mechanism against freezing), light (the photosynthetic activity of ice microalgae is a function of both light intensity and quality) and nutrients (nutrient limitation has been demonstrated even when ambient nutrient concentrations were high). The biological production at this energetic interface is examined in the specific context of the ice-water ergocline. (Auth.)

B-36564

Lutjeharms, J.R.E., Allanson, B.R., Parker, L., **Frontal zones, chlorophyll and primary production patterns in the surface waters of the southern ocean south of Cape Town,** *Elsevier oceanography series,* 1986 Vol.42, Marine interfaces ecohydrodynamics, edited by J.C.J. Nihoul, p.105-117, Refs. p.114-117.

Results of recent research cruises in the area between Africa and Antarctica are reviewed. They show that many fronts in this area exhibit relatively high chlorophyll concentrations at the sea surface, increases in potential primary production as well as increases in photosynthetic efficiency. These fronts, because of their unique and special characteristics, may thus offer superior areas for studying not only the interaction between physico-chemical factors and open ocean biological activity in general, but also southern ocean primary productivity in particular. (Auth. mod.)

B-36565

Williams, A.J., **Penguins of the world: a bibliography,** Cambridge, British Antarctic Survey, 1985, 255p.

DLC Z5333.P45P46 1985

The bibliography cites almost 2000 books, journal articles, and theses dealing with penguins. Although it is intended to be a comprehensive guide to the literature, certain categories of material have been excluded: histories of early antarctic expeditions, some very early taxonomic papers, other bibliographies, and book reviews. The bibliography contains most publications issued up to Dec. 1984 plus a few papers known to be in press at that time. Entries are listed alphabetically by author. Journal titles were abbreviated in South Africa, largely following the *World List of Scientific Periodicals.* Each reference includes codes indicating the species (SPP 1-16) and subjects (SUBJ 1-17) covered. The bibliography is followed by two indexes. In the first index, references are listed by species, subdivided by subject; in the second they are listed by subject, subdivided by species. (Auth.)

B-36576

Konda, T., **Vertical distribution of bacterial cell size and biomass in Lake Vanda, an antarctic lake,** *Antarctic record,* July 1987 31(2), p.109-117, In Japanese with English summary. Refs. p.116-117.

Vertical distribution of bacteria in Lake Vanda was examined by the acridine orange direct count (AODC) method in Dec. 1984 and the results were compared with those of Jan. 1984. Bacterial numbers, cell sizes, and biomass in the water showed an almost identical pattern of vertical distribution at the two sampling times. Total bacteria by the AODC method were in the order of 10,000 cells/ml in the water at the depth of 55 m and above, and increased markedly in the bottom water (69 m depth). Bacteria from waters between 5 and 60 m depths were dominated by rods of 1.0-2.0 micron length, and, particularly, filamentous bacteria more than 10 micron long occurred at relatively high frequency in the water above the depth of 55 m. Most bacteria from waters at depths below 65 m were coccoidal or short rods less than 1.0 micron long. Bacterial biomass estimated from cell volumes ranged from 0.0026 to 0.079 mgC/l. (Auth.)

B-36577

Fukui, F., Kadoya, N., Okabe, S., Komaki, Y., **Surface distributions of nutrients and chlorophyll *a* in the area between 90W and 20E of the antarctic ocean and adjacent seas,** *Antarctic record,* July 1987 31(2), p.118-130, Refs. p.128-130.

The surface distributions of chlorophyll *a* and nutrients were observed in the area between 90W and 20E of the antarctic ocean in Nov. and Dec. 1984, and in Jan. 1985. The mean concentrations of inorganic nutrients and chlorophyll *a* increase southward from the Subtropical region to the antarctic ocean. Regional changes of phosphate and nitrate concentrations in the antarctic water were small while those of silicate were large. High concentration of silicate was found in the Weddell Sea, and the average atomic ratio of Si:N:P was 44:16:1. These high silicates may have resulted by upwelling from the deep water. (Auth.)

B-36610

Olson, R.R., Bosch, I., Pearse, J.S., **Hypothesis of antarctic larval starvation examined for the asteroid *Odontaster validus*,** *Limnology and oceanography,* May 1987 32(3), p.686-690, 27 refs.

A persistent hypothesis to explain the prevalence of nonfeeding larvae in benthic invertebrates at high latitudes has been the assumed lack of available food. This hypothesis is based in turn on the assumption that the only significant source of larval food is phytoplankton. Calculation of the carbon requirement (from respiration data) of larvae of the antarctic asteroid *Odontaster validus* suggests that they could not survive on natural levels of phytoplankton. To test whether starvation occurs, *O. validus* larvae *in situ* was cultured. After 5 weeks, survivorship was 92.2% (N = three cultures of 30 larvae each). These data suggest that Chlorophyll *a* concentration is not a good indicator of food availability, and other sources of nutrition may be sufficiently abundant that starvation is not a major factor affecting the ecology of antarctic echinoderm larvae. (Auth.)

B-36616

Dahms, H.-U., **Postembryonic development of *Drescheriella glacialis* Dahms & Dieckmann (Copepoda, Harpacticoida) reared in the laboratory,** *Polar biology,* Dec. 1987 8(2), p.81-93, 13 refs.

All 6 naupliar and 5 copepodite stages of *Drescheriella glacialis,* a tisbid from antarctic fast ice, are described. A key for the identification of the naupliar stages is given. Sexual dimorphism makes its first appearance in the copepodid IV. The setae configuration of the exopod of the second antenna in copepodid I is considered to be an ancestral state, and subsequent ontogenetic reductions are proposed to be apomorphic processes. (Auth.)

B-36617

Brown, C.R., **Energy requirements for growth and maintenance in macaroni and rockhopper penguins,** *Polar biology,* Dec. 1987 8(2), p.95-102, 29 refs.

Mass-specific energy expenditures of macaroni and rockhopper penguins increased to levels 1.5 times that of hatchlings within 14-21 days of hatching and subsequently decreased. Lipid rate of accumulation increased after 30 days of age when male parents joined the females in feeding the chicks, decreasing markedly after 45 days of age. Protein doubled its initial rate of accumulation between 22 and 35 days of age. Thereafter the rate decreased until independence. Daily energy requirements of macaroni and rockhopper penguins increased from 417 and 211 kJ/d, respectively, in the first week after hatching to peaks of 1540 and 1170 kJ/d about halfway through the growth period before decreasing until independence. Total energy requirement for growth and maintenance was estimated to be 76200 kJ for macaroni penguins and 59400 kJ for rockhopper penguins, of which growth energy comprised 38% and 28%, respectively. Based on the energy requirements and population data, macaroni and rockhopper penguin chicks at Marion I. consume an estimated 4200 and 700 t of food, respectively, each year. (Auth. mod.)

B-36618

Iwasaki, N., Nemoto, T., **Distribution and community structure of pelagic shrimps in the southern ocean between 150E and 115E,** *Polar biology,* Dec. 1987 8(2), p.121-128, 39 refs.

Geographical distribution of biomass and species, community structure, and size comparisons of pelagic shrimps were investigated in the upper 1000 m in the southern ocean between 150E and 115E during Dec. 1985 and Jan. 1986. The biomass ranged from 0 to 4.25 g wet weight/1000 cu m collected by the IKMT and in general tended to decrease southward. The average biomass north of the Polar Front and in the Antarctic Zone was 2.55 and 0.40 g/1000 cu m, respectively. Twenty species were collected and of these eight were in the Antarctic Zone. Pelagic shrimps in the study area were assigned to 4 categories by their geographical distribution. It is suggested that oceanic fronts in the study area do not constitute a distributional barrier to lower meso- and bathy-pelagic shrimps. (Auth. mod.)

B-36619

Smith, V.R., **Production and nutrient dynamics of plant communities on a subantarctic island,** *Polar biology,* Dec. 1987 8(2), p.135-153, Refs. p.152-153.

Studies of plant standing crop and nutrient concentrations have enabled an assessment of the seasonal changes in nutrient standing stocks (the mass of nutrients per sq m) in 2 mire-grasslands at Marion I. Mire-grasslands are an important component of the island's vegetation, occurring on very wet peats and dominated by graminoids and bryophytes. Peak aboveground standing stocks of N, P and K in the vascular plant species of the mire-grasslands mostly occurred earlier in the season than did peak aboveground biomass, implying that aboveground accumulation rates of these nutrients were greater than the rate of biomass accumulation. Maximum Ca standing stocks coincided in the season with peak Mg and Na standing stocks occurred either before, or later than, peak shoot biomass. The most abundant element in the vegetation was N, followed by K. The net quantities of most nutrients translocated into the aboveground growth were mostly greater than the seasonal mean standing stocks in the aerial biomass. (Auth mod.)

B-36620

Forster, M.E., Franklin, C.E., Taylor, H.H., Davison, W., **Aerobic scope of an antarctic fish, *Pagothenia borchgrevinki,* and its significance for metabolic cold adaptation,** *Polar biology,* Dec. 1987 8(2), p.155-159, 31 refs.

Resting weight-specific oxygen consumption of the cryopelagic antarctic nototheniid *Pagothenia borchgrevinki* at 0 C was 39.6 ml/kg/h for a 50 g fish, with oxygen consumption values considerably below those reported by Wohlschlag (1964). Despite low basal metabolism, factorial aerobic scope is similar to that reported for most other teleost fish, as is the cost of net transport. Myotomal muscles were used only at the highest swimming speeds and once they were recruited the fish fatigued rapidly. After swimming, oxygen debt was repaid rapidly, with a half-time of 20 min. (Auth. mod.)

B-36628

Hale, M.E., **Epilithic lichens in the Beacon sandstone formation, Victoria Land, Antarctica,** *Lichenologist,* 1987 19(3), p.269-287, 11 refs.

The epilithic lichen flora on the Beacon sandstone formation in Victoria Land consists of 7 species: *Acarospora gwynnii* Dodge & Rudolph, *Buellia grisea* Dodge & Baker, *B. pallida* Dodge & Baker, *Carbonea capsulata* (Dodge & Baker) Hale comb. nov., *Lecanora fuscobrunnea* Dodge & Baker, *Lecidea cancriformis* Dodge & Baker, and *L. siplei* Dodge & Baker. The typification of the species is given along with description in Antarctica. (Auth.)

B-36680

Juilfs, H.B., Wägele, J.-W., **Symbiontic bacteria in the gut of the blood-sucking antarctic fish parasite *Gnathia calva* (Crustacea: Isopoda),** *Marine biology,* 1987 95(4), p.493-499, 30 refs.

Structure and ultrastructure of the digestive tract of the ectoparasitic stages of the antarctic isopod *Gnathia calva,* collected in the Weddell Sea and around the Antarctic Peninsula in the 1984-1985 season, are briefly described. There are only two digestive glands, with an ultrastructure similar to that of other isopods. The gut is divided into 6 regions: oesophagus, stomach, dilatable reservoir for sucked-in blood, sphincter, rectal vesicle with symbiontic bacteria, and rectum. The highly dilatable anterior hindgut (reservoir) takes part in the resorption of nutrients and stores lipids and glycogen. The rectal vesicle has an epithelium with all the features of an organ with high metabolism and the capacity for the transportation of small molecules. The surface is increased by irregular microvilli. A very thin intima and a basal labyrinth are present. The presence of symbiontic bacteria is discussed in correlation with the haematophagous nutrition of *G. calva.* (Auth.)

B-36683

Orchard, A.E., **Revision of the *Coprosma pumila* (Rubiaceae) complex in Australia, New Zealand and the subantarctic islands,** *Brunonia,* Mar. 16, 1987 9(2), p.119-138, 23 refs.

The widespread complex of mat-forming *Coprosma* species, hitherto known as *Coprosma pumila,* plus some close allies *(C. petriei, C. atropurpurea, C. nivalis)* have been reexamined. A new subspecies, *C. perpusilla* ssp. *subantarctica,* is erected for the plants on Macquarie, Auckland, Campbell and Antipodes Islands. The six species and two subspecies of the complex are keyed, fully described and illustrated,

and their interrelationships, particularly their trans-Tasman vicariance, are discussed. (Auth. mod.)

B-36684

Wlochowicz, A., Przygocki, W., Polowinski, S., **Crystallinity of krill chitin and its derivatives,** *Acta polymerica,* Mar. 1987 38(3), p.184-189, 17 refs.

X-ray, thermal and IR spectrometric investigations of krill chitin *(Euphausia superba)* and several of its derivatives were carried out. Indexes of crystallinity have been determined by integral and correlative methods. The interpretation of DTA thermograms and IR spectra is presented. (Auth.)

B-36685

Kellogg, D.A., Kellogg, T.B., **Diatoms of the McMurdo Ice Shelf, Antarctica: implications for sediment and biotic reworking,** *Palaeogeography, palaeoclimatology, palaeoecology,* July 1987 60(1-2), p.77-96, Refs. p.95-96.

In the course of investigations of the origin of the McMurdo Ice Shelf (MIS), diatoms in 59 sediment samples collected from its upper surface were analyzed. Fragments of centric marine species, most of which occur in the Ross Sea today, were found in all samples, but identifiable marine taxa dominated the total diatom flora in only two samples. In contrast, non-marine diatoms are abundant and diverse in most MIS samples. The combined marine and non-marine diatom floras of the MIS suggest a new mechanism to explain mixed diatom floras and sediments, observed in antarctic cores. These composite floras and sediments may be introduced or reintroduced to the marine environment during austral summers by melt water streaming off the front of the MIS or through crevasses. Additionally, icebergs calved from the MIS release their load of mixed biota and sediment when they melt. These observations may pertain to other present and former antarctic ice shelves that are characterized by surface ablation and basal freezing. (Auth. mod.)

B-36688

Guelin, A., Camus, P., Souchu, P., **Presence and vertical distribution of *Microvibrio marinus* in waters of the antarctic ocean Indian sector** [Présence et distribution verticale de *Microvibrio marinus* dans les eaux de l'Océan Antarctique (secteur Indien)], *Revue internationale d'océanographie médicale,* 1987 Vol.85-86, International Colloquium on Medical Oceanography, 8th. Proceedings, p.60-64, In French. 5 refs.

Sampling of sea water, carried out during the austral summer on board the *Marion Dufresne* during SIBEX-MD42 campaign to investigate the presence of *Microvibrio marinus* in antarctic waters, between the surface and 4000 m, is discussed. Microvibrios are predators of *Escherichia coli* Lille and other bacteria, and play a cardinal role in the process of sea water self-purification. Location of the 8 stations where samples were collected, and tabulated results, are given. Bacteriocidal activity has been detected in all samples collected. Significantly higher activity is found in antarctic waters than in temperate regions.

B-36689

Pichon, J.J., Labracherie, M., Labeyrie, L.D., Duprat, J., **Transfer functions between diatom assemblages and surface hydrology in the southern ocean,** *Palaeogeography, palaeoclimatology, palaeoecology,* Oct. 1987 61(1-2), p.79-95, Refs. p.93-95.

Interpretation of the distribution of 31 marine diatom species and two silicoflagellate genera in 28 core tops from the Atlantic and West Indian sectors of the southern ocean by Q-mode factor analysis allows definition of 3 significantly different floral assemblages, one associated with subantarctic and two with antarctic waters. These 3 areas are clearly delineated by prominent oceanographic limits: the Antarctic Convergence and the maximum retreat of sea-ice during the summer season. A set of paleoecological transfer functions is derived by comparison between the distribution of these associations and surface water hydrological parameters. Numerical tests of paleoecological equations demonstrate their usefulness to reconstruct the evolution of the surface oceanography of the austral ocean at different periods of the last climatic cycle. (Auth. mod.)

B-36692

Kanda, H., comp, **Catalog of moss specimens from Antarctica and adjacent regions,** Tokyo, National Institute of Polar Research, 1987, 186p., 18 refs.

The catalog contains data of moss specimens collected from Antarctica and adjacent regions, housed in Japanese herbaria. There are approximately 6000 specimens comprising 5500 musci and 500 hepatics, 5000 of which are housed in the herbarium of the National Institute of Polar Research (NIPR). The NIPR collection consists mainly of specimens brought back from the Showa Station area. Together with continental antarctic specimens, the herbarium houses the collections brought back from maritime Antarctica and subantarctic regions. Approximately 1000 antarctic specimens of musci are distributed in the following Japanese herbaria: the National Science Museum, Tokyo, the Hattori Botanical Laboratory, Nichinan and Hiroshima University. All antarctic specimens of these herbaria have been accumulated through exchanges with foreign herbaria. One of the features of the catalog is that all of the data is processed by the computer system of the institute (HITACHI M-260H), making sorting possible for taxonomic and geographic studies. (Auth. mod.)

B-36693

Everson, I., **Some aspects of the small scale distribution of *Euphausia crystallorophias*,** *Polar biology,* 1987 8(1), p.9-15, 14 refs.

Diurnal variations in the vertical distribution and swarming behavior of *Euphausia crystallorophias* at Deception I. are described. Swarms were present at all times of the day and night. By day swarms were compact and deep, they were dispersed and nearer to the surface by night. Significant net avoidance was noted by day. A twenty-fold discrepancy was found between abundance estimated from net hauls and acoustics. This difference is almost certainly because currently used Target Strength (TS) to size relationships overestimate TS and consequently underestimate euphausiid biomass. (Auth.)

B-36694

Godlewska, M., Klusek, Z., **Vertical distribution and diurnal migrations of krill—*Euphausia superba* Dana—from hydroacoustical observations, SIBEX, Dec. 1983-Jan. 1984,** *Polar biology,* 1987 8(1), p.17-22, 16 refs.

The depth distributions of krill density with the resolution of 0.435 m has been obtained on the basis of SIBEX hydroacoustic data. Krill was observed to be mainly in a layer from 20 to 100 m with the maximum of biomass migrating from the near surface area at night to greater depths during day. The parameters of migration pattern depend on the body length of krill. (Auth. mod.)

B-36695

Croome, R.L., Van den Hoff, J., Burton, H.R., **Observations of the heliozoean genera *Pinaciophora* and *Acanthocystis* (Heliozoea, Sarcodina, Protozoa) from Ellis Fjord, Antarctica,** *Polar biology,* 1987 8(1), p.23-28, 21 refs.

The heliozoeans *Pinaciophora denticulata* Thomsen, *Acanthocystis turfacea* Carter and *Acanthocystis* sp., collected from a marine

location in Ellis Fjord and grown in saline culture, are pictured by scanning and transmission electron microscopy. *P. denticulata* has been reported from cold marine localities elsewhere in the world, but marine reports of *Acanthocystis* are rare, and both *A. perpusilla* and *A. turfacea* have been reported previously only from fresh waters. (Auth.)

B-36696

Foster, B.A., **Composition and abundance of zooplankton under the spring sea-ice of McMurdo Sound, Antarctica,** *Polar biology,* 1987 8(1), p.41-48, 25 refs.

Zooplankton was sampled through holes in the sea-ice of McMurdo Sound from Nov. 8 to Dec. 10, 1985. Replicated vertical hauls were made to 100 and 300 m off Pram Point in the inner Sound, near the edge of the permanent McMurdo Ice Shelf. The zooplankton was sparse, averaging 2.5 mg/cu m wet weight. The numbers of individual species varied between catches, depths, and occasions. Generally, small copepods numerically dominated the catches, and higher densities of these were present in the shallower 100 m layer. Deeper hauls contained higher numbers of larger crustaceans. Pteropods *Limacina helicina* and *Clione limacina* werc also consistently caught, but in equal densities in 100 m and 300 m hauls. Numerous other plankters were caught in low numbers. Comparative samples, from 40 km further north and to 100 m deep, contained a similar species diversity to those near the McMurdo Ice Shelf, but always with higher densities of *L. helicina.* (Auth. mod.)

B-36697

Foster, B.A., Cargill, J.M., Montgomery, J.C., **Planktivory in *Pagothenia borchgrevinki* (Pisces: Nototheniidae) in McMurdo Sound, Antarctica,** *Polar biology,* 1987 8(1), p.49-54, 12 refs.

Specimens of the fish *Pagothenia borchgrevinki* were collected from just beneath the sea-ice in McMurdo Sound, Nov. 8 to Dec. 6, 1985. The stomach contents of 200 fish were analyzed and compared with the co-occurrence of the prey species in the plankton. Numerically, the dominant prey was a thecosomatid pteropod *Limacina helicina* (83%), followed by a hyperiid amphipod *Hyperiella dilatata* (5%). Other prey species in decreasing order of occurrence were *Euphausia crystallorophias, Euchaeta antarctica,* other copepods, a decapod crustacean larva, chaetognaths, the amphipods *Orchomene plebs* and *Epimiriella macronyx,* and unidentified juvenile fish. All prey except *O. plebs* and *E. macronyx* were taken in concurrent plankton samples. Although planktivory of *Pagothenia borchgrevinki* is confirmed, it is not certain whether feeding is confined to the immediate sub-ice environment. (Auth. mod.)

B-36698

Delille, D., **Spatial distribution of coastal antarctic seawater bacteria: relationship with avifauna,** *Polar biology,* 1987 8(1), p.55-60, Refs. p.59-60.

In order to evaluate the influence of birds, the relationships of spatial distribution of seawater bacterial microflora to penguin distribution were studied during the antarctic summer 1986 in Terre Adélie land area and in Jan. 1984 in the Kerguelen Archipelago. In seawater a clear decreasing gradient from the shore towards the open sea was found. All bacterial parameters studied (epifluorescence direct counts, frequency of dividing cells estimation and viable counts) were correlated significantly with penguin populations. Complementary numerical taxonomy confirmed the major role played by bird manuring in such antarctic ecosystems. (Auth. mod.)

B-36700

Mayzaud, P., Van Wormhoudt, A., Roche-Mayzaud, O., **Spatial changes in the concentrations and activities of amylase and trypsin in *Euphausia superba.* A comparison between activity measurement and immunoquantitation,** *Polar biology,* 1987 8(1), p.73-80, Refs. p.79-80.

Two digestive enzymes: alpha amylase and trypsin were purified by affinity chromatography from *Euphausia superba* and the corresponding anitbodies developed in male New Zealand rabbits. Enzyme activities and concentrations displayed significant spatial changes and a certain degree of association with the developmental stages sampled. Several inconsistencies in the relationships between growth stages and enzyme rates or quantities suggested that the spatial variations were not solely related to specific growth requirements but to combined effects of both physiological and environmental factors. Comparison of the spatial changes in concentration and activity showed that the changes in enzyme concentration were in a large part (60% of the total variance) responsible for the activity changes. The results strongly suggest that enzyme synthesis and degradation ensured the gross regulation of activity while modifications of the kinetic properties could be implicated in the fine tuning. (Auth. mod.)

B-36724

Márquez, M.E.I., **Enzyme polymorphism in antarctic krill *(Euphausia superba);* the phosphoglucomutase locus,** *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.335, 16p., 8 refs.

Two samples of krill *(Euphausia superba)* from the Atlantic sector of the antarctic ocean were examined for protein variation using starch gel electrophoresis to see whether or not they represented genetically separated populations. The phosphoglucomutase (PGM) locus was studied as a potential genetic tag. Observed PGM electrophoretic phenotypes, consisting of one or two zones of activity, were presumed to be the products of a four-allele polymorphism at a single locus. The observed phenotype frequencies were all in close agreement with those expected from the Hardy-Weinberg distribution. PGM allele distributions were similar in both samples of krill analyzed, and thus there is no evidence to suggest that more than one breeding population of krill was sampled. Further analyses of other polymorphic loci are needed, however, to confirm this finding. Differences in PGM allele and phenotype frequency data between this study and those of previous authors are discussed. (Auth.)

B-36726

Paggi, J.C., **Limnological studies on Deception Island, South Shetland Islands, Antarctica: taxonomy of crustacean zooplankton** [Estudios limnológicos en la isla Decepción, Shetland del Sur, Antártida: aspectos taxonómicos de los crustaceos del zooplankton], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.338, 34p., In Spanish with English, French and German summaries. Refs. p.30-34.

Results of analysis carried out on samples obtained from freshwater bodies on Deception I., during summer 1980-1981, are discussed. Specimens of *Alona weinecki* Studer and *Pseudoboeckella poppei* Mrázek are described and illustrated. Some hitherto unknown aspects of the morphology of *A. weinecki* (trunk limbs and head pores) are described. Taxonomy and geographic distribution are discussed. Some morphological and biometrical features of *P. poppei* populations are compared with samples from King George I. Variability and diagnostic values of several biometrical characters are discussed. (Auth. mod.)

B-36727
Leonardi, J.M., Marchetti, C., Monticelli, L., Osterrieth, M., **Preliminary characterization of organic soil under gramineae** [Caracterización preliminar de un histosol antártico bajo gramíneas], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.340, 17p., In Spanish with English, French and German summaries. 23 refs.

An organic soil under *Deschampsia antarctica* (Desv) on southern Danco Coast is described. It is classified as Cryosaprist (muck) genetically dependent on the gramineae which takes root in it. A good level of humification was observed and supra-optimal amounts of N and P were estimated. With the use of proof isolations in a rhizospheric scale, celulolitic molds, Mucorales and yeasts were detected. The bacterial flora associated with roots showed a broad metabolic diversity. The genus *Pseudomonas* prevailed, accompanied with *Micrococcus* sp., Enterobacteriaceae species and coryneforms. More than half of the strains grow at 0 C. Evidence of marine influence on the grassland is reported. (Auth. mod.)

B-36728
Dinofrio, E.O., **Chaetognaths, polychaetes and amphipods in waters off South Orkney Is.** [Quetognatos, poliquetos y anfipodos planctonicos de aguas cercanas a las islas Orcadas del Sur], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.341, 17p., In Spanish with English and French summaries. 27 refs.

Seventy-two samples of zooplankton, collected at different depths (25-0, 50-25, 100-50 and 200-100 m) at 18 stations near South Orkney Is. have been studied during Jan. and Feb. 1981. Three species of chaetognaths, 4 of polychaetes and 4 of amphipods, were identified, noting in the analyzed groups the numeric predominance of the species *Eukrohnia hamata, Pelagobia longicirrata* and *Parathemisto gaudichaudii,* respectively. The horizontal distribution of the collected species is discussed. (Auth.)

B-36729
Alder, V.A., Tomo, A.P., **Postlarval fish distribution in the Atlantic sector of the antarctic ocean** [Distribución de postlarvas de peces en el sector Atlántico del Océano Antártico], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.342, 11p., In Spanish with English, French and German summaries. 20 refs.

Information is presented on the distribution of the ichthyoplankton present in 256 zooplankton samples collected in different cruises carried out by the R/V A.R.A. *Islas Orcadas* between the years 1975 and 1979. The area sampled comprised waters surrounding the Scotia Arch islands, the Scotia Sea, the Drake Passage, and the northern part of the Weddell Sea. The following families were recorded: Myctophidae, Channichthyidae, Nototheniidae and Paralepididae, represented by 7 species, all of them in the postlarval developmental stage. Myctophid larvae were the most frequent and abundant in the collection. (Auth.)

B-36732
Fukuchi, M., **Moored Buoy experiment in Breid Bay, Antarctica,** *Polar news,* Jan. 1987 No.44, p.17-22, In Japanese.

A moored system, consisting of a continuous measuring-recording buoy of *in-situ* chlorophyll *a,* temperature and depth, the sequentially multiple-sampling sediment trap and current meter, was designed for clarifying the long-term as well as fine scale temporal resolution on plankton variation. The system was deployed at 70 11.536'S, 24 18.679'E (water depth, 286 m) in the center of Breid Bay, Antarctica. The experiment lasted for 47 days between Dec. 28, 1985 and Feb. 13, 1986, and covered the blooming of phytoplankton in the Antarctic coastal water. Preliminary results are presented.

B-36733
Christie, P., **C:N ratios in two contrasting antarctic peat profiles,** *Soil biology and biochemistry,* 1987 19(6), p.777-778, 14 refs.

In a study of 2 contrasting bryophyte-dominated communities on Signy I., the changes in concentration of organic C and total N, determined at monthly intervals throughout the summer, are compared. C:N ratios at various depths within the peat profiles were calculated and are discussed in relation to the different amounts of peat accumulation under the two contrasting vegetation types. The two sites on Signy I. were established for long-term study in 1970 and 1071. The relatively dry turf community is dominated by *P. alpestre* and *C. aciphyllum* while the permanently wet carpet is dominated by the mosses *C. sarmentosum, C. austrostramineum* and *D. uncinatus.* The mean organic C and total N results at different depths within the peat profiles are presented in a table, together with the means of the calculated C:N ratios. The differences in C:N ratio observed between these two moss communities are so large that they serve to emphasize the difference in decomposition rate which has contributed to the very large difference in the extent of peat accumulation in the two contrasting community types. (Auth. mod.)

B-36745
Mathew, K.J., Vincent, D., **Daily variations in the abundance of zooplankton in the coastal waters of Queen Maud Land, Antarctica during summer 1983-'84,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.97-108.

The antarctic summer, which lasts for a short period, brings in cyclical changes in the sea with regard to production at the various levels. The initial change in this dynamic environment is triggered off by the primary producers with the onset of long and bright sunny days. The next in series is the zooplankton which, owing to the availability of large quantities of food materials, multiply and grow in this season. During this expedition efforts were made to understand the variations taking place in Jan. and Feb. 1984 by taking daily samples from a polynya in the coastal waters off Queen Maud Land. It was found that the zooplankton underwent a phase of multiplication followed by a period of growth and these two life processes surpassed grazing by the higher-ups and this continued until very late in the summer after which a decline in the populations was noted. The major groups of zooplankters studied for their increase over time were euphausiids, copepods, chaetognaths, appendicularians, ostracods, polychaetes and siphonophores. (Auth. mod.)

B-36746
Pant, A., **Studies on antarctic phytoplankton,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.87-96, 20 refs.

Ice-edge data from a single polynya station at 70S 11E over a 2-month period is assessed in relation to previously published work in similar environments. The phytoplankton community seems to be composed of 2 quite different elements, the first from ice-algae released by melting and the second consisting of planktonic algae. Biomass measured as chlorophyll *a,* ATP and cell counts is discussed in relation to primary production and doubling rates. (Auth.)

B-36747
Thomas, P.A., Mathew, K.J., **Sponges collected during the Third Indian Antarctic Research Expedition with description of *Isodictya echinata* sp. novo,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.109-116, 2 refs.

Six species of sponges collected from antarctic waters off Queen Maud Land Dec. 1983 to Mar. 1984 are described with suitable illustrations. Of the 6 species, 3 are referable to the class Demospongiae Sollas and the others to the class Hexactinellida Schmidt. One species of the class Demospongiae, *Isodictya echinata* is described here as new to science. (Auth.)

B-36748

Mathew, K.J., **On the sea birds observed during the Third Indian Antarctic Expedition,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.117-128, 7 refs.

The avian fauna of the southern oceans is rich and varied especially south of the sub-tropical convergence where the ocean is more productive at all the levels. The birds were seen between Mauritius and Antarctica during the Third Indian Antarctic Expedition (1983-'84). The birds observed generally belonged to penguins, albatrosses, petrels, prions, noodies, fulmars, terns and skuas. A total of 34 species was observed, belonging to 22 genera and 7 families of which 8 species occurred on the antarctic continent and the adjacent waters. The birds had definite geographical limits in distribution. Some species, namely, Brown noddy, Dove prion, Kerguelen petrel, Blue petrel, Southern fulmar and Wilson's storm petrel were quite remarkable in having a very narrow geographical range. The wandering albatross, although appearing in small numbers, seemed to range maximally latitudinally. Others which had a wide latitudinal range were the petrels which were numerically abundant too. (Auth.)

B-36749

Thomas, P.A., Mathew, K.J., ***Primnoisis spicata*** **(Hickson) (order gorgonacea Lmx. family isididae Lmx.) from the antarctic sea,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.129-132, 2 refs.

Primnoisis spicata (Hickson), collected from the antarctic sea (69 deg 54'S, 12 deg 49'E) during the Third Indian Antarctic Research Expedition is described and illustrated. This species was first recorded from McMurdo Bay and is here reported from another locality, which considerably widens its distribution in the antarctic ocean.

B-36750

Prabhu Matondkar, S.G., **Microbiological studies in Schirmacher Oasis, Antarctica: effect of temperature on bacterial populations,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.133-147, 14 refs.

Seasonal and site-wise variation in size and diversity of bacterial population was observed in Schirmacher Oasis. Prevailing soil temperature limited the distribution and abundance of groups of bacteria like psychrophiles, psychrotrophs and mesophiles. Pulses in the bacterial cycle were also found as a function of daily and seasonal variations in air and soil temperature. Requirement of growth temperature of individual bacterium is the best physiological marker to work out the survival strategies of micro-organisms. Effect of seasonal variations in temperature was directly manifested in diversity index and generation time of micro-organisms. In temperature response study, organisms like *Serratia* were found tolerating very low temperatures (-40 C), indicating the physiological adaptation of bacteria to persisting sub-freezing temperatures. (Auth.)

B-36751

Mathew, K.J., **Spatial distribution of krill** ***(Euphausia superba)*** **and other zooplankton off Queen Maud Land, Antarctica,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.149-159, 11 refs.

Zooplankton samples were collected during the Third Indian Expedition to Antarctica (1983-'84) over an area of more than 60,000 sq km between latitudes 67 deg 30'S and 68 deg 00'S and longitudes 14 deg 00'E and 20 deg 00'E just outside the pack-ice in Mar. 1984. The standing crop of zooplankton, including krill, in the area investigated is estimated at 99.8 cc/1000 cu m of water. The volume of plankton obtained from different stations varied between 10.02 and 248.82 cc/1000 cu m of water. Large concentrations of krill were not observed because of the heavy blooming of a diatom in the area. The average biomass of euphausiids mainly composed of the krill in the area studied is 4.45 cc/1000 cu m of water. They were represented at an average rate of 212 individuals (9.93 gm)/1000 cu m of water. Eleven other groups of zooplankton were also present in the area sampled of which copepods chaetognaths, appendicularians and fish eggs were the most abundant. (Auth. mod.)

B-36752

Mathew, K.J., Vincent, D., **Latitudinal distribution of zooplankton in the southern ocean with special reference to Euphausiids,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.161-174, 8 refs.

Zooplankton samples were collected during the Third Indian Expedition to Antarctica, from the edge of the pack ice to 20 deg S along an oblique course between 22 deg 56'E and 56 deg 53'E. The area included the Antarctic, sub-antarctic and sub-tropical zones where the surface water temperature ranged from 1.5 C to 27.5 C with striking variations at the Antarctic and sub-tropical Convergences. The zooplankton obtained was subjected to volumetric and numerical analyses. For euphausiids, besides the above, gravimetric analysis was also done. Zooplankton was found especially more in antarctic waters where an average value of 105.64 cc/1000 cu m of water was obtained. Plankton at the various stations fluctuated between 29.41 cc and 329.34 cc/1000 cu m of water. When considered numerically, the highest density of 199 zooplankton organisms/cu m of water was present at the station at the Antarctic Circle. The euphausiids constituted 13.67% of zooplankton by volume. A gravimetric estimation revealed that the euphausiids were relatively more in the antarctic and sub-antarctic waters which together accounted for 89.30% of the total euphausiids obtained. When considered numerically, the maximum abundance of euphausiids (4,347/100 cu m of water) was at 53 deg 21'S, 48 deg 04'E. Altogether 20 groups of zooplankters were present with the maximum numerical abundance of copepods. The zooplankton groups showed differential distribution in each latitudinal zone. Seven groups, namely euphausiids, copepods, chaetognaths, appendicularians, ostracods, siphonophores and foraminiferans occurred at all the stations sampled. (Auth. mod.)

B-36753

Tilak, S.T., **Aerobiological investigations,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.175-177.

During the Third Indian Scientific Expedition to Antarctica, a few air samples for aerobiological investigations were collected between Mar. 5th and 13th, 1984 using a Tilak's Continuous Air Sampler for studying the microparticles of biotic origin distributed in the air over the southern ocean. The results of these investigations are given in this paper. (Auth.)

B-36764

Tucker, M.J., Burton, H.R., **Survey of the marine fauna in shallow coastal waters of the Vestfold Hills and Rauer Islands, Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Dec. 1987 No.55, 24p., 9 refs.

A twelve month sampling program was conducted in the Vestfold Hills, Antarctica to determine the coastal marine fauna of the area. A species list of the animals inhabiting the benthic, pelagic, planktonic and ice-water interface communities investigated is presented with

ecological information about each collection site. Most of the collected species appear to be circumpolar and some information is provided on their distribution within the Vestfold Hills region. (Auth.)

B-36766

Hosie, G.W., Ikeda, T., Stolp, M., Williams, R., **ADBEX III cruise krill/zooplankton sampling data,** *Australian National Antarctic Research Expedition. ANARE research notes,* Dec. 1987 No.57, 34p., 8 refs.

During the ADBEX III cruise (Sep. to Dec. 1985) to the western Prydz Bay region, 9 shallow hauls (0-200 m), 6 deep hauls (200-1000 m) and one target trawl were made with a RMT 1+8 net, as well as 11 vertical hauls with an ORI-2000 net. From these samples abundance of euphausiids, notably krill *Euphausia superba,* and other zooplankton was investigated. A diving program was also carried out to observe and collect *Euphausia superba* from under the pack-ice. For postlarval krill, size (length, weight), sex and maturity composition are reported. (Auth.)

B-36767

Wand, U., Hiller, A., **Carbon-14 investigations on petrel breeding places** [Kohlenstoff-14-Untersuchungen an Sturmvogelnistplätzen in der Antarktis], *Beiträge zur Vogelkunde,* 1987 33(3/4), p.129-140, In German with English summary. 40 refs.

For the first time an attempt is made to estimate the age of breeding places of petrels (snow petrel, antarctic petrel) on the antarctic continent by the radiocarbon dating method. The material used for dating was solidified stomach oil of petrels, which can form up to 0.5 m thick stratified organic deposits around the nesting sites. Samples from 3 antarctic localities have been studied: Mt. Provender, Wohlthat Mountains and fresh stomach oil of a cape pigeon *(Daption capensis)* from King George I. The samples from the first two sites gave surprisingly high maximum ages, namely, 9000 yrs. BP and 4000 yrs. BP, respectively. The results and their possible paleogeographic and paleoclimatic implications are briefly discussed. It is concluded that radiocarbon measurements are generally suitable for the dating of breeding places of petrels in the Antarctic. (Auth.)

B-36768

Gebauer, A., Peter, H.-U., Kaiser, M., **Floristic ecological investigations in Antarctica—illustrated by the example of the distribution of *Deschampsia antarctica* Desv. in the area of the Fildes Peninsula/King Geoge Island (South Shetland Islands)** [Floristisch-ökologische Untersuchungen in der Antarktis—dargestellt am Beispiel der Verbreitung von *Deschampsia antarctica* Desv. im Bereich von Fildes Peninsula/King George Island (South Shetland Islands)], *Naturwissenschaftliche Rundschau,* 1987 36(3), p.505-515, In German with English and Russian summaries. 13 refs.

An account is presented of the distribution of *Deschampsia antarctica* in the SW region of King George Island. Tufts or cushions of this grass are found on 20 stands, of which only 8 were previously known. One notable stand is on Nebles Point. Exposure and water budget are important factors influencing the distribution of *D. antarctica.* Moist and north exposed slopes and plateaus are preferred. Stability of substrate, nitrogen supply and degree of mechanical load are abiotic and biotic factors also discussed. (Auth. mod.)

B-36771

Nakatsubo, T., Ino, Y., **Nitrogen cycling in an antarctic ecosystem. 1. Estimation of the amount of nitrogen fixation in a moss community on East Ongul Island,** *Ecological research,* Apr. 1987 2(1), p.31-40, 27 refs. For Part 1 see 15B-34657.

Nitrogen fixation by cyanobacteria in a moss community on East Ongul I. was investigated using the acetylene reduction method. The effects of temperature, radiation, desiccation and rehydration on the acetylene reduction rates were examined. A simple predictive model was constructed in order to estimate the amount of nitrogen fixed in the field. Using this model, the daily amount of nitrogen fixation was calculated from microclimatic data (temperature and radiation) in 1983 and 1984. The cumulative amount of nitrogen fixation in the growing season during this period was estimated to be 329 mg N/sq m of moss community. It is suggested that nitrogen fixation by cyanobacteria in the moss community is important as a nitrogen source for the community growth on East Ongul I. (Auth. mod.)

B-36772

Gadel, F., Bruchet, A., **Application of pyrolysis-gas chromatography-mass spectrometry to the characterization of humic substances resulting from decay of aquatic plants in sediments and waters,** *Water research,* Oct. 1987 21(10), p.1195-1206, Refs. p.1205-1206.

In the deposits of the Kerguelen Is. and of a "blue lake" in Greenland, the importance of algal populations is emphasized by pyrolysis products corresponding to nitrogenous and carbohydrate derivatives. Phenols and cresols in the pyrochromatograms of these samples are interpreted as evidence of polypeptides rather that lignin: *p*-cresol is much more abundant than the other cresols, suggesting the formation of phenols by way of tyrosine. Lagoonal sediments, in contrast, seem typical of intermixed development of algae and phanerogams. Differences between fulvic and humic acids are emphasized by the development of polyphenols and protein derivatives in humic acids compared to polysaccharide derivatives in fulvic acids. Other constituents revealed by PY-GC-MS include *N*-acetyl aminosugars, phthalates and aliphatic compounds. (Auth. mod.)

B-36784

Rakusa-Suszczewski, S., **Matter transport in the near shore ecosystem of the Admiralty Bay (King George Island, South Shetlands),** *Comité National Français des Recherches Antarctiques. CNFRA,* 1987 No.57, Colloque sur l'Ecologie marine des îles subantarctiques et antarctiques, Paris, June 25, 1985, p.7-15, Refs. p.13-15.

Admiralty Bay is an area of complex investigations carried out in recognition of its functioning as an inshore part of the antarctic maritime ecosystem. Attention is called to the process of matter transport which seems to be one of the main indicators of the functioning of the near shore ecosystem. Transport of matter between Branfield Strait, the Admiralty Bay and the land occurs both from land to sea and from sea to land. It is caused by wind, tides, currents, waves, and fresh water outflow, and also by penguins, seals and flying birds. The matter transport fluctuates seasonally and from year to year showing the instability of the polar ecosystem. (Auth.)

B-36786

Delille, D., Lemoine, G., **Seasonal dynamics of subantarctic marine heterotrophic microflora** [Dynamique saisonnière des microflores hétérotrophes marines subantarctiques], *Comité National Français des Recherches Antarctiques. CNFRA,* 1987 No.57, Colloque sur l'Ecologie marine des îles subantarctiques et antarctiques, Paris, June 25, 1985, p.27-36, In French. 39 refs.

The seasonal evolution of heterotrophic water and sediment microflora from Morbihan Bay was regularly analyzed during one year by a technique based on 27 characters. A strong predominance of Gram bacillus, related to the Pseudomonad family, was found. The water and sediment microflora are very close. The seasonal evolution is accompanied by biochemical and taxonomic potential modifi-

cations. All growth stages correspond to an increase in Pseudomonads. The intervals are more diversified and include representatives of such species as *Acinetobacter, Bacillus* and *Arthrobacter.*

B-36787

Robineau, D., **Data on the ecology of Commerson's dolphin from Kerguelen Islands** [Données sur l'écologie du dauphin de Commerson aux îles Kerguelen], *Comité National Français des Recherches Antarctiques. CNFRA,* 1987 No.57, Colloque sur l'Ecologie marine des îles subantarctiques et antarctiques, Paris, June 25, 1985, p.37-45, In French with English summary. 9 refs.

Commerson's dolphin is the only delphinid species commonly found in coastal waters of the Kerguelen Is. During summer (season in which the reproduction occurs) the dolphins are present in areas which offer calm waters even by bad weather and a certain protection against killer whales. In this season diet is mainly ichthyophagous, but the species seems able to feed on almost all animal resources of its biotope, bottom fauna included. Commerson's dolphins are intermediary hosts for subadult nematode parasites genus *Pseudoterranova.* Larvae of this parasite are found in the muscles of one fish species included in the diet of the dolphins. Round marks on the skin, possibly due to attachment of commensal crustaceans are sometimes present. Low levels of chlorinated hydrocarbons were found in dolphins' blubber. This confirms the occurrence of such contaminants in oceanic areas very far from the main sources of pollution. (Auth.)

B-36788

Knox, G.A., **Littoral ecology of the subantarctic region: with special reference to the New Zealand subantarctic islands,** *Comité National Français des Recherches Antarctiques. CNFRA,* 1987 No.57, Colloque sur l'Ecologie marine des îles subantarctiques et antarctiques, Paris, June 25, 1985, p.47-79, Refs. p.74-79.

Current information on the vertical zonation patterns of the plants and animals of the littoral zones of the island groups to the south of New Zealand is summarized. Comparisons are made with the southern New Zealand mainland and in particular with Steward Island, as well as with similar island groups at the same latitude. Distribution patterns are related to patterns of fronts, water masses and currents in the region. The true subantarctic islands differ from the New Zealand mainland in the following respects: the absence of littorinid molluscs except for the Auckland Islands; the absence of barnacles apart from one species on the Auckland Islands; the absence of many New Zealand zone forming algal species; and the absence of many of the common New Zealand dominant animal species especially gastropod molluscs. The subantarctic cold temperate zone as a whole is characterized by the possession of a common basic zonation pattern with dominant algal genera such as *Hildenbrandia, Iridea, Porphyra,* and *Lessonia* and species such as *Durvillaea antarctica, Macrocystis pyrifera* and *Adenocystis utricularis.* Species diversity is a function of both the size and isolation of the island group as well as of latitude. Characteristic features of the subantarctic are the prominent role played by lichens in intertidal zonation patterns and the richness of the fauna of the littoral fringe, in particular of the species associated with seaweed debris. Subantarctic islands with long geological histories, such as Kerguelen, which possibly once were directly connected to Antarctica, possess a large number of endemic species. Islands on continental shelves have a component of their biota which also occur on the adjacent land masses. (Auth. mod.)

B-36789

Miquel, J.C., Arnaud, P.M., **Biological aspects of *Lithodes murrayi* (Crustacea:Decapoda) from Crozet Islands, subantarctic Indian Ocean** [Aspects de la biologie de *Lithodes murrayi* (Crustacea:Decapoda) aux îles Crozet, océan Indien Subantarctique], *Comité National Français des Recherches Antarctiques. CNFRA,* 1987 No.57, Colloque sur l'Ecologie marine des îles subantarctiques et antarctiques, Paris, June 25, 1985, p.81-89, In French with English summary. 11 refs.

Three cruises of the *Marion-Dufresne* have been concerned with biological studies on the southern King crab *Lithodes murrayi* around Crozet Islands. Fishing with traps and beam trawl provided biological data on 1178 specimens from various depths down to 1,000 m. These data are used to survey some major biological characteristics of *L. murrayi:* population structure, vertical migrations, size hierarchy (dominance of the males), reproductive peculiarities (sex ratio, fecundity), diet, and ecological niche. The resulting biological pattern is shown to be different from those already known in other species of Lithodidae, but is in accordance with the southern habitat of *L. murrayi.* (Auth.)

B-36790

Duhamel, G., **Reproduction of Nototheniidae and Channichthyidae from Kerguelen Islands** [Reproduction des Nototheniidae et Channichthyidae des îles Kerguelen], *Comité National Français des Recherches Antarctiques. CNFRA,* 1987 No.57, Colloque sur l'Ecologie marine des îles subantarctiques et antarctiques, Paris, June 25, 1985, p.91-107, In French with English summary. 32 refs.

The reproduction of the ten species of Nototheniidae and Channichthyidae from the Kerguelen Is. shelf and surrounding seamounts has been analyzed between 1979 and 1985. The gonad cycle of the species is annual and the spawning season occurs during autumn or winter inside the coastal waters and on the slope of the shelf or connecting seamounts, at depths down to 250 m. The absolute fecundity of the Channichthyidae is lower than for the Nototheniidae. *Notothenia squamifrons* has the highest relative fecundity. Intraspecific variation in fecundity is noticeable in the *Champsocephalus gunnari* populations. The spawning is benthic for all the species and eggs have sometimes a diameter of more than 5 mm. Large yolky eggs are a characteristic of antarctic fish. (Auth. mod.)

B-36791

Schatt, P., Feral, J.P., Guille, A., **Marine ecology of subantarctic and antarctic islands. Incubation, biochemical composition and energy values in some subantarctic echinoderms** [Ecologie marine des îles subantarctiques et antarctiques. Incubation, constitution biochimique et valeurs énergétiques chez quelques échinodermes subantarctiques], *Comité National Français des Recherches Antarctiques. CNFRA,* 1987 No.57, Colloque sur l'Ecologie marine des îles subantarctiques et antarctiques, Paris, June 25, 1985, p.109-118, In French with English summary. 20 refs.

Adaptation, or specialization, of leader species from subantarctic benthic invertebrates are considered at several levels of organization (organ, organism, population) in echinoderms. It is indicated that a factor, often taken into account alone or indicated as the most important, temperature, is not sufficient to explain the adaptation of species to a certain environment. The knowledge of the biology of species, characteristics of an environment, at different levels of organization and at varying stages of their life cycle, allows for a better understanding of the phenomenon. (Auth.)

B-36792
Iwasaki, N., Nemoto, T., **Pelagic shrimps (Crustacea:Decapoda) from the southern ocean between 150E and 115E,** *Tokyo. National Institute of Polar Research. Memoirs. Series E, Biology and medical science,* Aug. 1987 No.38, 40p., Refs. p.34-39.

Twenty species of pelagic deep water shrimps, from southern Australia to Antarctica, are described. One species, *Gennadas kempi* Stebbing, is recorded for the first time from the antarctic ocean. *Pasiphaea acutifrons* Bate and *P. scotiae* (Stebbing) are fully re-described. *P. longispina* Lenz and Strunck is synonymized with *P. scotiae.* (Auth.)

B-36800
Schumacher, U., Welsch, U., **Histological, histochemical, and fine structural observations on the spleen of seals,** *American journal of anatomy,* Aug. 1987 179(4), p.356-368, 26 refs.

Spleens of three species of antarctic seals with different diving habits (Weddell seal, crabeater seal, and fur seal) have been studied with histological, histochemical, and electron microscopic methods. The spleens can be classified as nonsinusoidal, with capsule and trabeculae rich in innervated smooth muscle cells. The trabecular system is particularly well developed in the deep- and long-diving Weddell seal. As in other mammals the pulp can be divided into white and red pulp. In the white pulp, periarteriolar lymphatic sheaths and secondary lymphatic nodules occur; both are surrounded by a marginal zone rich in macrophages and eosinophils. In the red pulp, morphological evidence for the following functions has been found: destruction of erythrocytes, erythropoiesis, and thrombopoiesis. The seals have an open vascular compartment in their spleens, as also occurs in the cat. The red pulp is innervated by numerous nerve fibers that seem to include both cholinergic and adrenergic ones. (Auth. mod.)

B-36801
Fricke, H., Oehlenschläger, J., **Fatty acid and sterol composition of the antarctic amphipod *Themisto gaudichaudii* Guerin 1828,** *Comparative biochemistry and physiology,* 1988 89B(1), p.39-42, 13 refs.

Themisto gaudichaudii Guerin 1828 is known to occur in swarms comparable to antarctic krill *(Euphausia superba* Dana) and it forms a part of the diet of antarctic fishes, the sei whale and penguins. The valid name of this species of the genus *Themisto* (Amphipoda:-Hyperiidea) is *Themisto gaudichaudii,* but the former name *Parathemisto gaudichaudii* is still in use. Biochemical analysis of this amphipod, caught in waters off Elcphant I. on Mar. 17, 1985, shows the following: 56 different fatty acids and 7 sterols were found and identified; 20:5(n-3), 22:6(n-3), 16:0, 18:1(n-9), 16:1(n-7) and 18:1(n-7) were the dominating fatty acids in total lipids, phospholipids and triacylglycerols; *T. gaudichaudii* contains an extremely high content of 20:5(n-3) (21.1%) and 22:6(n-3) (15.9%) in total fatty acids; the sterol fraction contained cholesterol, desmosterol and 22-dehydrocholesterol as main components. (Auth. mod.)

B-36804
Parmelee, D.F., Pietz, P.J., **Philopatry, mate and nest-site fidelity in the Brown skuas of Anvers Island, Antarctica,** *Condor,* Nov. 1987 89(4), p.916-919, 18 refs.

For 9 austral summer seasons (Oct. to Mar.) the authors and others observed two skua species that breed sympatrically near Palmer Station on Anvers I. South Polar skuas nest here in the hundreds and forage primarily at sea. Brown skuas nest in much smaller numbers and feed at Adélie Penguin colonies. During the first 7 seasons, the studies centered on behavioral and ecological relationships between the two species. During the final two seasons every effort was made to locate previously banded adults and young within the principal study area and in outlying regions. Because skuas may live over 30 years and do not breed until several years old, long-term studies are essential for understanding their population biology. In this paper Brown skua mate and nest-site fidelity over an 11-year period are summarized, and returns of banded young to their natal areas are reported. (Auth.)

B-36805
Pietz, P.J., **Feeding and nesting ecology of sympatric South Polar and Brown skuas,** *Auk,* Oct. 1987 104(4), p.617-627, 44 refs.

In the 1979-1980 and 1980-1981 austral summers, nesting and feeding ecology of South Polar and Brown skuas near Palmer Station are examined. As earlier studies had suggested, South Polar skuas fed mostly at sea on fish, and Brown skuas fed mostly on penguin eggs and chicks. These dietary differences correlated with differences in the skuas' time budgets, activity patterns, territory types, breeding chronologies, nest densities, clutch sizes, and fledging success. With combined data from this and other studies at Palmer, average productivity for both species over 7 breeding seasons was calculated. Brown skuas fledged higher and more consistent numbers of young per pair, probably because of their accessible and reliable food source. (Auth.)

B-36806
Kaiser, M., **Births on ice and snow: how Weddell seals come into the world** [Geburten in Eis und Schnee: wie Weddellrobben zur Welt kommen], *Urania,* 1987 No.6, p.34-37, In German.

A brief account is given of the antarctic spring seal pupping season on the ice shelf covering the Weddell Sea. Adaptations have been made by the seals to survive the bitter antarctic climate: the heavy layer of pup blubber which turns the cold aside; the high production of high fat content mother's milk consumed by the young at a rate of 1.5-3 kg/day. The seal marking process which enables scientists to follow seal growth over the years is described.

B-36807
Peter, H.-U., **Skuas—antarctic predatory gulls** [Skuas—antarktische Raubmöwen], *Urania,* 1987 No.10, p.38-45, In German.

A group of biologists from the GDR, working out of Bellingshausen Station, continued its studies of the birds of King George Island. In this note a description is given of various behavioral patterns characteristic of the Brown and South Polar skuas: predatory action and methods; foraging at sea, which sometimes entails three hours of flying; and courtship and breeding/nesting activities. The broad spectrum of skua food preferences and the birds' physical attributes (beak and claws) which provide the means for obtaining the food are shown as important relationships. Photos of the birds and a geographic distribution chart of the antarctic skuas supplement the text.

B-36815
Green, K., Burton, H.R., **Annual and diurnal variations in the underwater vocalizations of Weddell seals,** *Polar biology,* 1988 8(3), p.161-164, 9 refs.

Weddell seal vocalizations were recorded once a fortnight throughout 1984 at a major pupping site near Davis. Few vocalizations were heard between Jan. and June. The number of vocalizations recorded increased from July to a peak in Nov. and early Dec. during the breeding period and then fell off rapidly through Dec. The increase in the number of seal vocalizations was correlated with a build up in seal numbers but some of the increase may be explained by an increased rate of vocalization by males. (Auth.)

B-36816
Green, K., Burton, H.R., **Do Weddell seals sing,** *Polar biology,* 1988 8(3), p.165-166, 8 refs.

A series of underwater calls in the form of a recognizable sequence is described for the Weddell seal. The sequence was only heard from the period of pupping to the end of mating in 1984, but not 1983. (Auth.)

B-36817

Davison, W., Forster, M.E., Franklin, C.E., Taylor, H.H., **Recovery from exhausting exercise in an antarctic fish, *Pagothenia borchgrevinki*,** *Polar biology,* 1988 8(3), p.167-171, Refs. p.170-171.

Pagothenia borchgrevinki, an antarctic teleost fish was swum to exhaustion and changes in lactic acid levels and blood haematocrit were monitored during recovery. The fish did not perform well at high swimming speeds due to an inability of the white myotomal muscle to produce ATP by anaerobic glycolysis. Consequently, low levels of lactic acid were produced which were fairly rapidly broken down. Haematocrit values were low in non-exercised fish, and these increased by over 100% during exercise, falling back to control levels over many hours. This is probably related to the increased oxygen demand during exercise. (Auth.)

B-36818

Kappen, L., Straka, H., **Pollen and spores transport into the Antarctic,** *Polar biology,* 1988 8(3), p.173-180, Refs. p.179-180.

Pollen deposition in a 7 cm thick moss turf *(Polytrichum juniperinum)* from a site in Admiralty Bay and in three cushions of *Schistidium antarcticum* (1-3 cm thick) from Bailey and Clark Peninsula (Wilkes Land) were investigated. Twenty-four pollen and spore taxa were identified from a total of 1094 grains in the sample from Admiralty Bay. By contrast, the 3 samples from Wilkes Land contained only 10 grains (5 taxa). While the former sample was poor in lichen-mycobiont spores the latter revealed very many. It seems that the presence of cryptogamic species in the maritime antarctic zone is predominantly the result of long-distance transport from neighboring South America and a selection by climatic factors. The low frequency of pollen in Wilkes Land indicates a separation of this part of Antarctica from propagule exchange with other continents and the cryptogams of most of the antarctic continent may represent a largely relictual flora which survived in ice-free refugia. (Auth.)

B-36819

Siegel, V., Mühlenhardt-Siegel, U., **On the occurrence and biology of some antarctic Mysidacea (Crustacea),** *Polar biology,* 1988 8(3), p.181-190, 26 refs.

Ten species of Mysidacea were sampled during SIBEX cruises to the Antarctic Peninsula region from 1983 to 1986. The commonest were *Antarctomysis maxima, A. ohlini* and *Mysidetes posthon.* For these species the size and maturity stage composition as well as the length-weight relationships are given. The species considered are growing slowly and attain a long life span. Fecundity was low, mean number of offspring was about 13 for *M. posthon* and 21 for *A. maxima.* Rematuration was observed for the species *A. maxima,* indicating several spawning events during its life span. Biomass production is low for *A. maxima,* shown by a P/B-index of 0.98. Mortality of this species was estimated to be $Z=1.1$, which indicates that 33% of the specimens of an age group survive until the next year. The distribution and spatial separation of the two *Antarctomysis* species is discussed. (Auth. mod.)

B-36820

Smith, V.R., **Production and nutrient dynamics of plant communities on a subantarctic island,** *Polar biology,* 1988 8(3), p.191-211, 29 refs.

Studies of plant standing crop and nutrient concentrations have enabled an assessment of the seasonal changes in nutrient standing stocks (the mass of nutrients per sq m) in a fjaeldmark and two fernbrake communities on Marion I. These communities are an important component of the island's vegetation on rocky plateaux and slopes. For most species the aboveground accumulations of N, P and K early in the season were more rapid than increases in the aerial biomass. Rates of Ca, Mg or Na accrual were either similar to, or lower than, rates of aboveground growth. Nutrient (N+P+K+Ca+Mg+Na) standing stocks at the three communities were high; 71 g/sq m at fjaeldmark, 116 g/sq m at open fernbrake and 154 g/sq m at closed fernbrake. The aboveground component accounted for 47% to 65% of these values. N was the most abundant element in the vegetation, followed by K (closed fernbrake) or Ca (open fernbrake and fjaeldmark). (Auth. mod.)

B-36821

Hosie, G.W., Ikeda, T., Stolp, M., **Distribution, abundance and population structure of the antarctic krill *(Euphausia superba* Dana) in the Prydz Bay region, Antarctica,** *Polar biology,* 1988 8(3), p.213-224, Refs. p.223-224.

Krill exhibited a patchy distribution and overall low abundance. The majority of sampling sites in Jan. 1985 returned no post-larval krill or densities of <1 individual/1000 cu m. The estimated mean abundance of *E. superba* in Jan. 1985 was 6 individuals or 2 g (wet wt.)/1000 cu m integrated for the upper 200 m of the water column which represented 3.4% of the total zooplankton biomass. No more than 5 years-groups, including the larvae, were observed in Prydz Bay, with mean lengths of groups 1+, 2+, 3+ and 4+ being 24, 38, 46 and 53 mm (standard 1), respectively in the middle of Jan. A high proportion of naupliar stages observed in Jan. 1985 indicated that spawning in Prydz Bay begins in Jan. and examination of adult maturation showed that the spawning continues at least to Mar. (Auth. mod.)

B-36822

Hubold, G., Hempel, I., Meyer, M., **Zooplankton communities in the southern Weddell Sea (Antarctica),** *Polar biology,* 1988 8(3), p.225-233, 20 refs.

Standardized abundances of 40 frequently occurring macrozooplankton taxa collected by double-oblique bongo net hauls between the surface and 200 m depth were submitted to an agglomerative hierarchical cluster analysis, to characterize surface zooplankton communities in the southern and eastern Weddell Sea. The sensitivity of the analysis concerning reduction of the number of considered taxa (especially stages of species) was tested. Dominant taxa in the entire area over the whole period were copepods *Metridia gerlachei* and *Calanoides acutus. Calanus propinquus, Appendicularia* spp. and calyptopis-1 larvae of krill, *Euphausia superba* were abundant at 73S/19W. *Euphausia crystallorophias* and larval fish *Pleuragramma antarcticum* dominated at 77S/40W on the southern shelf. Possible mechanisms for the maintenance of the community structures are discussed. A simplified method of characterizing communities, based on analysis of euphausiids, is presented. (Auth. mod.)

B-36826

Mujica R., A., Asencio V., V., **Composition and relative abundance of antarctic zooplankton in the Bransfield Strait (SIBEX-Phase II, Chile),** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.71-80, 15 refs.

For Spanish version and abstract see B-35275.

B-36827

Asencio V., V., Mujica R., A., **Ichthyoplankton of the Bransfield Strait (SIBEX-Phase II, Chile),** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.81-86, 15 refs.

For Spanish version and abstract see B-35276.

B-36828
Acuña, E.S., **Lanternfishes (family Myctophidae) collected during SIBEX-Phase II cruise in the Bransfield Strait, Antarctica,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.87-99, Refs. p.98-99.

For Spanish version and abstract see B-35277.

B-36829
Moreno, C., Rueda, T., Asencio, G., **Trophic niche of *Pleuragramma antarcticum* in the Bransfield Strait, Antarctica: quantitative comparison with other areas of the southern ocean,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.101-124, 18 refs.

For Spanish version and abstract see B-35279.

B-36830
Leader-Williams, N., Smith, R.I.L., Rothery, P., **Influence of introduced reindeer on the vegetation of South Georgia: results from a long-term exclusion experiment,** *Journal of applied ecology,* Dec. 1987 24(3), p.801-822, Refs. p.821-822.

The subantarctic island of South Georgia has a species-poor vascular flora that is not adapted to grazing by vertebrates. Consequently, reindeer *(Rangifer tarandus* L.) introduced to different areas of the island in 1911 and 1925 have had a serious impact on the vegetation. Experimental exclosures and cages were established in various plant communities in 1973-74, and changes in floristic composition and vegetation cover have been recorded for 12 years. Recovery of vegetation in exclosures showed that the native grass *Poa flabellata* and the dwarf shrub *Acaena magellanica* increased in cover in response to removal of grazing pressure. In contrast, the introduced grass *Poa annua* and, to a lesser extent, the moss *Polytrichum* and bare ground decreased in cover in response to exclusion. (Auth. mod.)

B-36831
Hayward, P.J., Thorpe, J.P., **Systematic position of *Smittia inclusa* Waters, an endemic antarctic bryozoan,** *Journal of natural history,* Nov.-Dec. 1987 21(6), p.1469-1476, 7 refs.

Smittia inclusa has been identified in 16 samples of bryozoan material from the 'Discovery' collections (incorporating the earlier collections of the National Antarctic Expedition, 1901-1904, and the British Antarctic Expedition, 1910-1913) from both western Antarctica (Bellingshausen Sea, Palmer Archipelago, South Shetland Is.) and eastern Antarctica (Oates Land, Ross Sea). An account of the morphology of *Smittia inclusa* based on scanning electron microscopy of these samples is presented, resolving the question of its systematic position.

B-36833
Webber, P.J., **Terrestrial biology in Antarctica since the International Geophysical Year,** *Antarctic journal of the United States,* Dec. 1986 21(4), p.1-6, 41 refs.

The research history of antarctic life sciences is reviewed. It is pointed out that more research is being done in marine biology than in terrestrial biology, reflecting a funding pattern and the extremely limited area on the continent available to land creatures. A recent trend in research activities has been the shift from the single investigator working in a small area to international programs on global scales carried out by multi- or interdisciplinary teams or groups of specialists. The antarctic terrestrial ecosystems are reviewed, two comprehensive volumes (1984 and 1985) on terrestrial and marine biology are mentioned, and three significant research themes, cold adaptations, conservation, and Martian analogs for extraterrestrial life, are discussed. The review closes with some thoughts on the directions of future research.

B-36836
Goodall, R.N.P., Galeazzi, A.R., **Cetacean survey in eastern Tierra del Fuego and Isla de los Estados,** *Antarctic journal of the United States,* Dec. 1986 21(4), p.15-17, 8 refs.

Results of whale sightings and strandings observed during a Nov. 1981 cruise of RV *Hero* are presented. The sightings were made while *Hero* was in transit between islands or between beaches. The survey covered 33 beaches and 19 different bays during the 10-day voyage. Vertebrae and crania were collected, or photographed when size or condition prevented collecting, taken aboard *Hero* and deposited with the Goodall collection and Territorial Museum in Ushuaia. Details of the collecting and identification are given.

B-36841
Clarke, A., **Preliminary radioisotope study of the fate of ingested palmitic acid in the antarctic krill, *Euphausia superba* Dana,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.99-107, 7 refs.

The fate of dietary palmitic acid was followed in male and female antarctic krill by allowing them to ingest a microencapsulated diet containing [C-14]palmitate in cod-liver oil. The ratio of label incorporated into the hepatopancreas to that in the muscle reached a steady state after 4 hours. In male krill 65% of label was located in the hepatopancreas and 35% in the muscle. In female krill the proportions of total activity in the hepatopancreas, ovary and muscle were 59%, 11% and 30% respectively. The lipid class distribution varied with both sex and tissue, but in most cases 90% of the label was located in the triacylglycerol and phospholipid fractions. Very little activity was recovered from the free fatty acid fraction, indicating that ingested palmitate was rapidly esterified. No activity could be detected in wax ester, suggesting that the small amounts of wax in adult *E. superba* are not metabolically active, and may be merely the result of ingesting the occasional copepod. Data from ingestion studies with C-14-labelled algae were variable and difficult to interpret. (Auth.)

B-36842
Poncet, S., Poncet, J., **Censuses of penguin populations of the Antarctic Peninsula, 1983-87,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.109-129, 16 refs.

In four years between 1983 and 1987, breeding sites of penguins were mapped and breeding numbers estimated along the west coast of the Antarctic Peninsula. This gave almost complete coverage of all suitable areas between 63 deg 17S and 69S. For Adélie penguins the region has 99 colonies, over 50 previously unreported, with a total of 125,000 pairs. There are about 55,000 pairs of chinstrap penguins in 126 colonies, over 100 previously unreported, and about 19,000 pairs of gentoo penguins, in 40 colonies. Comparisons are made with previous data; most colonies are stable, some increasing slightly; a few appear to have decreased. Chinstraps may be extending southwards, with a pair observed at 65 deg 52'S. (Auth.)

B-36845
Bonner, W.N., Honey, M.R., ***Agrotis ipsilon* (Lepidoptera) at South Georgia,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.157-161, 12 refs.

It is likely that apart from a few small refugia, South Georgia was ice-covered as recently as 10,000 years BP. In consequence, most of the terrestrial flora and fauna have been established since then, accounting for the relatively low level of endemicity. The processes of colonization, resulting from chance arrivals at a favorable habitat, are of general interest to biogeographers. This paper records 3 occurrences of the moth *Agrotis ipsilon* at South Georgia, and the circumstances of its arrival are discussed. (Auth.)

B-36846

Usher, M.B., Dastych, H., **Tardigrada from the maritime Antarctic,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.163-166, 4 refs.

Between Feb. 1981 and Mar. 1982 vegetation and soil samples were collected from many localities in the maritime Antarctic; these samples were extracted for their soil arthropods. The extracts contain a total of 219 individual tardigrades of 14 taxa. With these, plus a species in a genus not previously recorded in Antarctica, and one taxon previously recorded only from East Antarctica, 23 species are now known to occur in the maritime Antarctic. In the species list included, the species name and number of specimens in the present collection are given. All specimens are being deposited in the British Museum (Natural History). (Auth. mod.)

B-36847

Oppenheim, D., Pugh, G.J.F., **Checklist of marine diatoms found on wood blocks exposed in the littoral environment of Signy Island, South Orkney Islands,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.167-171, 27 refs.

As part of a study of marine fungi in antarctic inshore waters, a number of wood blocks were exposed in Borge Bay, Signy I. It was found that in addition to fungal colonization, diatoms also occurred on many of the blocks. This note describes the species found in these assemblages.

B-36848

Smith, H.G., **Species-poor testate rhizopod fauna on Brabant Island,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.173-176, 11 refs.

During 1984 and 1985 a Combined Services Expedition took place on Brabant I., 40 km west of the Antarctic Peninsula. In Feb. and Mar. 1984, thirty 1.0-1.5 g samples of vegetated terrestrial materials were collected from peninsulas in the north-western part of the island. These were sealed in Jorgensen bottles with Bouin's fixative for transport to the UK. The samples were analyzed for testate rhizopod by the direct observation method. Quantitative counts were done where possible to estimate the live population density at the time of sampling. Observations on empty tests or recognizable fragments were also used to assemble a species list. (Auth.)

B-36855

Reynolds, R.T., McKay, C.P., Kasting, J.F., **Europa, tidally heated oceans, and habitable zones around giant planets,** *Advances in space research,* 1987 7(5), p.125-132, 27 refs.

Tidal dissipation in the satellites of a giant planet may provide sufficient heating to maintain an environment favorable to life on the satellite surface or just below a thin ice layer. In our own solar system, Europa, one of the Galilean satellites of Jupiter, could have a liquid ocean which may occasionally receive sunlight through cracks in the overlying ice shell. In such a case, sufficient solar energy could reach liquid water that organisms similar to those found under antarctic ice could grow. In other solar systems, larger satellites with more significant heat flow could represent environments that are stable over an order of Aeons and in which life could perhaps evolve. We define a zone around a giant planet in which such satellites could exist as a tidally-heated habitable zone. This zone can be compared to the habitable zone which results from heating due to the radiation of a central star. In our solar system, this radiatively-heated habitable zone contains the Earth.

B-36857

Keys, H., **Environmental impact assessment in New Zealand's antarctic programme—where to from here? A presentation to the NZARP Seminar on the 1986/87 Field Season,** *New Zealand antarctic record,* 1987 8(1), p.9-17, 10 refs.

There is an increasing intensity and diversity of human activities in the Antarctic. The 50% increase in the number of Consultative Parties to the Antarctic Treaty since 1977 has meant more bases and other buildings have been constructed and more scientific programs and logistic support carried out. This increase is likely to continue since there has been a 210% increase in the number of states who have acceded to the Treaty since 1977. In addition, there is currently a growing number of independent expeditions. This increased activity is leading to an increased potential for significant environmental damage and degradation. As a tool to be used to protect the environment in the New Zealand Antarctic Research Program, the Environmental Impact Assessment is analyzed, its strengths and weaknesses are enumerated and its general approach is compared to that of SCAR.

B-36858

Broady, P.A., **Protection of terrestrial plants and animals in the Ross Sea regions, Antarctica,** *New Zealand antarctic record,* 1987 8(1), p.18-41, 38 refs.

Because of the recent marked increase in human activity in Antarctica and the prospect of this increase continuing and intensifying, the current protection afforded by the Antarctic Treaty to the antarctic environment is examined for adequacy now and in the near-term future. Reviewed is the protection which has been given to the terrestrial ecosystem in the form of reserved areas with limited access. A summary is provided for areas in Antarctica in general and those in the Ross Sea regions are assessed in more detail. At the present these provide a minimal protection for a fraction of the terrestrial ecosystem. How this protection could be increased and the knowledge that is needed in order to increase it effectively are considered. In the Antarctic Treaty System there are two designations for areas in which wildlife is afforded protection: these are "Specially Protected Areas" (SPAs) and "Sites of Special Scientific interest" (SSSIs). SPAs provide the strongest protection. Permits are required for entry into any area designated as an SPA but not for entry into an SSSI. However, the latter require permits if there is any likelihood of disturbance to penguins or seal colonies, or if samples are to be collected. Details of the operation of these designations are discussed in terms of the strengths and weaknesses of the SPA and SSSI provisions in the Antarctic Treaty System.

B-36864

Rodhouse, P.G., Clarke, M.R., Murray, A.W.A., **Cephalopod prey of the wandering albatross *Diomedea exulans*,** *Marine biology,* Oct. 1987 96(1), p.1-10, 25 refs.

Cephalopod beaks from the stomach contents of "wandering albatross" *(Diomedea exulans* L.) chicks from Bird I., South Georgia, were sampled between May and Sep. in 1983 and 1984. Lower beaks were identified and measured, and allometric data were used to calculate mantle length and biomass of the species consumed. A total of 3,421 lower beaks were examined, representing 35 species in the 1983 sample and 45 species in the 1984 sample. Eight of the twenty families contributed over 95% of the biomass. In 1984 there were less Onychoteuthidae and more Ommastrephidae than in 1983 and a decrease in the number of species known to occur south of the Antarctic Polar Front. There was a difference in the size-freqeuncy distribution of the cephalopod diet in the two years; in 1984 there was a higher frequency of intermediate-sized specimens, reflecting the greater importance of ommastrephids, especially *Illex* sp. The energy content of cephalopods in 1984 may have been greater than in 1983. Serial sampling of cephalopod beaks during the austral winter did not reveal

evidence of growth. By the age of 200 d, wandering albatross chicks have consumed a total of approximately 100 kg wet weight of cephalopods each. (Auth.)

B-36865

Hopkins, T.L., **Midwater food web in McMurdo Sound, Ross Sea, Antarctica,** *Marine biology,* Oct. 1987 96(1), p.93-106, 28 refs.

The trophic structure of the midwater ecosystem of McMurdo Sound in Feb. 1983 was examined through diet analysis of 35 species of zooplankton and micronekton. Ten feeding groups were suggested through cluster analysis. The two largest clusters consisted of small-particle grazers and omnivore generalists; the eight remaining clusters were of carnivores specializing on one or several types of metazoan prey. Diet composition often shifted with ontogeny and though exceptions occurred, diet diversity usually increased either during early growth or throughout development. Comparison with a krill-dominated area along the Antarctic Peninsula (Croker Passage) indicated that species common to the two areas occupied approximately the same trophic position. Biomass in McMurdo Sound was much lower than in Croker Passage and large-sized particle grazers such as krill and salps were trophically less dominant in McMurdo Sound. Krill in Croker Passage in the fall entered the midwater food web primarily as detritus (molts); in McMurdo Sound it was mostly as live furcilia. Sampling in McMurdo Sound was during a plankton bloom and calculations of grazing rates suggest that much of the primary production settled through the water column uneaten. (Auth.)

B-36866

McClintock, J.B., Pearse, J.S., **Reproductive biology of the common antarctic crinoid *Promachocrinus kerguelensis* (Echinodermata: Crinoidea),** *Marine biology,* Nov. 1987 96(3), p.375-383, 43 refs.

Histological examinations of the gonads of *Promachocrinus kerguelensis* Carpenter, 1888, collected in Nov. 1984 from McMurdo Sound, revealed ripe ovaries containing 3 distinct size classes of oocytes: 20 to 90, 91 to 150 and 151 to 180 microns diameter as well as ova. Testes were ripe and filled with mature sperms. There was marked inter-pinnule and inter-individual synchrony of gametogenesis and spawning is probably synchronous, at least within the subpopulation sampled. The number of eggs per pinnule is allometrically related to body size. Body weight and arm length are positively correlated with total egg number. Annual fecundity was estimated to be 29,000 eggs (full-grown oocytes and ova) for a crinoid weighing 53.6 g wet weight with an arm length of 16.3 cm. The eggs float. Female genital pinnules contain more lipid and energy than male pinnules. Spawning in *P. kerguelensis* probably occurs in Nov. and Dec. within McMurdo Sound. If development is slow, as in all other antarctic echinoderms studied to date, then settlement most likely occurs 2 to 3 mo. later, after the short summer period of high phytoplankton productivity. High fecundity, a pelagic mode of reproduction, and the high probability of a slow rate of development may contribute to the wide geographic distribution of this common antarctic crinoid. (Auth.)

B-36870

Levenshteĭn, R.IA., **On the ways of formation of the deep sea polychaete fauna of the family Polynoidae,** International Polychaete Conference, 1st, Sydney, Australia, July 1983. Proceedings. Edited by P.A. Hutchings, Sydney, Linnean Society of New South Wales, 1984, p.72-85, 28 refs.

DLC QL391.A6I56

The distributional patterns of 20 genera and 40 species of polynoid polychaetes belonging to 6 deep-sea subfamilies indicate that some deep-sea taxa were formed in different regions of the world oceans. The subfamily Macellicephalinae is the oldest abyssal polynoid group, whose initial center of formation was in the marginal parts of the Tethys Sea (western part of the recent Pacific and eastern part of the recent Atlantic). The high degree of taxonomic isolation of the polynoid fauna in different regions of the world oceans, as well as in different vertical zones, also indicates that the eastern Pacific and basins of the Arctic and Antarctic were also centers of formation. (Auth.)

B-36871

Blake, J.A., **Polychaeta Oweniidae from antarctic seas collected by the United States Antarctic Research Program,** International Polychaete Conference, 1st, Sydney, Australia, July 1983. Proceedings. Edited by P.A. Hutchings, Sydney, Linnean Society of New South Wales, 1984, p.112-117, 15 refs.

DLC QL391.A6I56

Four species of Oweniidae have been identified from among collections taken by the USNS *Eltanin* from antarctic seas. New records and descriptive comments are provided for 3 previously known species: *Myriochele heeri, M. scotiae* and *Myrioglobula antarctica. Galathowenia wilsoni* is new to science. Taxonomic criteria separating *Myriochele* and *Galathowenia* are reviewed. (Auth.)

B-36872

Knight-Jones, P., Knight-Jones, E.W., **Systematics, ecology and distribution of Southern Hemisphere spirorbids (Polychaeta; Spirorbidae),** International Polychaete Conference, 1st, Sydney, Australia, July 1983. Proceedings. Edited by P.A. Hutchings, Sydney, Linnean Society of New South Wales, 1984, p.197-210, 27 refs.

DLC QL391.A6I56

In the Antarctic, spirorbid assemblages are mostly Romanchellinae or Paralaeospirinae and in the tropics they are mostly Pileolariinae or Januinae. Just north of the antiboreal convergence there is an even balance between the two components. In Antarctica, the only representatives of the tropical subfamilies are two Pileolariinae. Of these *Nidificaria dalestraughanae* is circumglobal, eurythermal and eurybathic. The other may perhaps be *Pileolaria rosepigmentata,* which is widespread in south temperate latitudes. (Auth. mod.)

B-36874

DeVries, A.L., **Antifreeze glycopeptides and peptides: interactions with ice and water,** *Methods in enzymology,* 1986 127(0), p.293-303, 19 refs.

DLC QP601.M49

Survival in ice-laden seawater in cold-blooded vertebrates is linked to the presence of biological antifreeze compounds in their blood circulation and in most of the other body fluids. In almost all antarctic notothenioid fishes and arctic gadoid (cods) fishes, the antifreeze compounds are a series of glycopeptides of similar composition, but varying between 2,600 and 33,000 daltons in size. The composition and best available estimates of size for the antifreeze glycopeptides and peptides are given in a table for several cold-water species. Experiments on detection, isolation, and purification of the antifreeze proteins, and antifreeze interactions with ice, are reviewed.

B-36876

Monteiro, A.M.G., Tommasi, L.R., **Ophiuroidea from the Antarctic and the Subantarctic. 1. Three species of Gorgonocephalidae and Ophiacanthidae** [Ophiuroidea das regiões antártica e subantártica. 1. Sobre três espécies de Gorgonocephalidae e Ophiacanthidae], *São Paulo. Instituto oceanográfico. Boletim,* 1983 32(1), p.33-54, In Portuguese with English summary. Refs. p.53-54.

The geographic distribution and variations of morphological characteristics of 3 species of ophiuroids *(Gorgonocephalus chilensis, As-*

trotoma agassizii, Ophiacantha antarctica) from the Antarctic and the Subantarctic are studied. Observations on reproductive biology are presented. (Auth.)

B-36877

Tommasi, L.R., Tommasi, R.L., **Ophiuroidea from the Antarctic and the Subantarctic. 2. Variations of *Gorgonocephalus chilensis* (Philippi) (Echinodermata, Ophiuroidea, Gorgonocephalidae)** [Ophiuroidea das regiões antártica e subantártica. 2. Variações em *Gorgonocephalus chilensis* (Philippi) (Echinodermata, Ophiuroidea, Gorgonocephalidae)], *São Paulo. Instituto oceanográfico. Boletim,* 1983 32(1), p.55-61, In Portuguese with English summary. 12 refs.

198 specimens of *Gorgonocephalus chilensis* collected in antarctic and subantarctic waters show a great variety of exterior morphological characteristics. This does not seem to relate to their geographic location. The samples were obtained during the 1962-1972 cruises of the R/V *Hero* and *Eltanin* (USARP) and by the R/V *Almirante Saldanha* from the Brazilian Navy.

B-36878

Phan, V.N., **Notes on electropherograms of eye-lens, muscle proteins and zymograms of muscle esterases of fish collected during the First Brazilian Expedition to Antarctica,** *São Paulo. Instituto oceanográfico. Boletim,* 1983 33(2), p.201-212, 24 refs.

A preliminary study was carried out on electropherograms of eye-lens, muscle proteins and zymograms of muscle esterases of 10 *Notothenia larseni,* 6 *Notothenia nudifrons* and one lanternfish, *Electrona antarctica.* Eye-lens proteins showed 3 types of electropherograms for *N. larseni* and 2 types for *N. nudifrons.* One of the electropherograms of *N. larseni* can be readily distinguished from those of *N. nudifrons.* Electropherograms of muscle proteins of *N. larseni* and *N. nudifrons* are very similar and consist of 16-17 fractions. Electropherograms of muscle proteins of *N. larseni* are severely affected by the conservation of the extracts overnight under -20 C. All *N. nudifrons* were of the same zymograms of esterases while those of *N. larseni* varied. Electropherograms of eye-lens and muscle proteins as well as zymograms of esterases of the lanternfish are different from those of nototheniids. (Auth. mod.)

B-36881

Bayly, I.A.E., Burton, H.R., **Vertical distribution of *Paralabidocera antarctica* (Copepoda:Calanoida) in Ace Lake, Antarctica, in summer,** *Australian journal of marine and freshwater research,* 1987 38(4), p.537-543, 15 refs.

In an ice-covered (thickness 1.68 m) meromictic lake, in early Jan. 1982, a vertical profile of the population density of *P. antarctica* showed two peaks: from 7 to 130 cm beneath the ice, and just above the anoxylimnion at 10.0-10.5 m. Copepodite stages III and IV were dominant in the first (shallow) peak and stage CV was dominant in the second (deep) peak. Significantly more adult males than females were present within an entire vertical column of oxylimnion, but more adult females than males were present in a stratum 30 cm thick immediately beneath the ice. (Auth.)

B-36888

Cottarelli, V., Baldari, F., ***Rossopsyllus obscurus* n. sp. (Copepoda, Harpacticoida) from Macquarie Island, South Pacific Ocean,** *Crustaceana,* Sep. 1987 53(2), p.181-185, 4 refs.

A new species of *Rossopsyllus, R. Obscurus* n. sp., collected in littoral subterranean waters of Macquarie I., is described with some systemic and biogeographic considerations. The new species seems to confirm the faunistic peculiarity of the area, since *Rossopsyllus* and *Tapholaophontodes* are at present found only in the interstitial waters of Macquarie and Kerguelen Is.

B-36889

Barber, D.L., Mills Westermann, J.E., Storoz, P., ***Haemogregarina nototheniae* n. sp., from the blood of antarctic nototheniids,** *Systematic parasitology,* Oct. 1987 10(2), p.135-147, 23 refs.

A new species, *Haemogregarina nototheniae,* n. sp., is described from the southern ocean teleosts *Notothenia neglecta* and *Notothenia rossii.* Stages identified as macro- and microschizogony and gametogony are described in mononuclear leukocytes from fish caught during the austral summer. The gametocyte has a central nucleus and 2-16 subterminal eosinophilic granules, but no polar cap. During microschizogony the schizont nucleus undergoes repeated division without cytoplasmic division to give 32 nuclear masses, all of which appear to be in metaphase. Cytoplasmic division yields free merozoites identifiable by the coarse chromatin of the nuclear area. During macroschizogony the intraleukocytic parasite swells to a subspherical mass with a median band of fine heterochromatin granules. The cytoplasm later divides, forming three merozoites. There appear to be two routes by which merozoites proceed to become gametocytes: in winter small merozoites are seen in mature erythrocytes; but in summer, in erythroblasts. The invertebrate definitive host and the means of transmission are unknown, but the parasite is provisionally assigned to the genus *Haemogregarina.* (Auth. mod.)

B-36890

Wells, R.M.G., **Respiration of the antarctic fish from McMurdo Sound,** *Comparative biochemistry and physiology,* 1987 88A(3), p.417-424, Refs. p.423-424.

Resting rates of oxygen uptake were measured for 9 species of unstressed fish living at -1.8 C in McMurdo Sound. The cryopelagic *Pagothenia borchgrevinki* regulated oxygen uptake down to a critical PO2 of about 60 mmHg. The inactive benthic species *Trematomus centronotus* extracted oxygen to lower PO2 and appeared to have a lesser degree of oxyregulation when the data were analyzed using a quadratic model. Cutaneous oxygen uptake in the nototheniids *T. bernacchii* and *P. borchgrevinki* amounted to 9 and 17% of total VO2 under normoxic conditions which is less than that reported for scaleless antarctic fish. The contentious concept of metabolic cold adaptation in polar fish has been reviewed, and the opinion expressed that the phenomenon cannot be dismissed on the grounds of technically incompetent measurement, or through inappropriate extrapolation of data from fish at lower latitudes. (Auth. mod.)

B-36894

Everson, I., Murphy, E., **Mesoscale variability in the distribution of krill *Euphausia superba*,** *Marine ecology progress series,* 1987 40(1-2), p.53-60, 15 refs.

Pairs of parallel transects, one to the south and the other to east of King George I., were surveyed in sequence 8 times to determine whether there was any consistency in the pattern of krill distribution and abundance along and between the transects. Vertical migration to the surface at night took krill out of the acoustically sampled layer and caused underestimation of abundance. Krill patches were carried passively along the transects in the main current. There was no evidence for krill becoming concentrated in a large eddy at the eastern end of the area. (Auth.)

B-36895

Reichardt, W., **Differential temperature effects on the efficiency of carbon pathways in antarctic marine benthos,** *Marine ecology progress series,* 1987 40(1-2), p.127-135, Refs. p.133-135.

Enzymatic activities and metabolic rates, which play key roles in benthic carbon turnover, were characterized with respect to cold

adaptation in aphotic antarctic sediments. Temperature optima for CO2 dark fixation and mineralization of glucose coincided largely with the maximal growth temperatures of obligate psychrophilic bacteria (at 20 C and below). On the other hand, predominantly extracellular enzyme activities involved in the conversion of particulate organic matter (POM) into dissolved organic matter (DOM), such as scleroprotease and chitinase, had considerably higher temperature optima (40 to 55 C). This lack of cold adaptation at the activity level was less strongly expressed in other hydrolases (sulfatase, alkaline phosphatase). Substrate affinities or activation energies were often inapplicable or insignificant as a potential measure of temperature adaptation. Alternative strategies of cold adaptation may be relevant at the level of synthesis of POM-solubilizing enzymes. (Auth.)

B-36899

Finegold, L., **Molecular aspects of adaptation to extreme cold environments,** *Advances in space research,* 1986 6(12), p.257-264, 40 refs.

Here are reviewed and summarized the strategies adopted by living organisms to survive low temperatures, from a molecular and membrane point of view. Two prime examples of connections between biological cold adaptation and the molecular level are antifreeze proteins in fish from cold sea water (the DNA sequence of the protein gene is now known) and the fluidity characteristics of cell membranes in a wide variety of organisms. In model membranes of phospholipids, stabler s-phases have recently been found to form at low temperatures. Antarctic endolithic organisms, living just under the surface of rocks, are exposed to long periods of low temperatures, and may develop such phases in their membranes. In the saturated phosphatidyl cholines, only lipids with a restricted range of acyl chain lengths show simultaneously s-phases and a main transition: this restricted range is about the restricted range found in natural membranes. The s-phases also form in the presence of natural cryoprotectants, and may be connected with botanical vernalization. (Auth.)

B-36900

Friedmann, E.I., **Antarctic cold desert and the search for traces of life on Mars,** *Advances in space research,* 1986 6(12), p.265-268, 13 refs.

The cryptoendolithic microorganisms that live inside rocks in the frigid Ross Desert of Antarctica can serve as a terrestrial model for what may have happened to life forms on Mars when the planet became dry and cold. Trace fossils of microbial rock colonization exist in Antarctica, and similar structures could have formed on Mars. In some respects, such trace fossils could be an easier target for life-detection systems than fossils of cellular structures. (Auth.)

B-36901

Hirsch, P., **Microbial life at extremely low nutrient level,** *Advances in space research,* 1986 6(12), p.287-298, 52 refs.

Many microogranisms (oligotrophs) grow in distilled water. All are euryosmotic and often grow also in higher concentrations of salts and nutrients. Natural locations with extremely low nutrient levels (snow, rain water pools, springs, free ocean water, antarctic rocks and soils) do not contain more than 1-5 mg/l of organic carbon. Oligotrophs found here are especially adapted to constant famine: they frequently live attached to surfaces, form polymers and storage products even while starving, and often aggregate. Based on *in vitro* experiments various properties of the oligotrophs are tabulated.

B-36913

Gorelova, T.A., Kobylianskiĭ, S.G., **Feeding of deepsea fishes of the family Bathylagidae,** *Journal of ichthyology,* 1985 25(3), p.89-100, Translated from Voprosy ikhtiologii. 15 refs.

DLC SH1.V713

Quantitative composition of the food of 8 species of the family Bathylagidae based on data collected in the eastern temperate and tropical parts of the Pacific Ocean and Atlantic sector of the Antarctic are reported. Zooplankton such as Gymnosomata, Thecosomata, Appendiculariae, Chaetognatha, Polychaeta etc. are predominant in the stomach contents of bathylagids. The percentage of completely digested and unidentified food is high. (Auth.)

B-36915

SooHoo, J.B., **Spectral light absorption and quantum yield of photosynthesis in sea ice microalgae and a bloom of *Phaeocystis pouchetii* from McMurdo Sound, Antarctica,** *Marine ecology progress series,* Aug. 1987 39(2), 78 refs.

Measurements were made in Dec. 1984 for both congelation ice and platelet ice microalgae and for a bloom of the planktonic prymnesiophyte *Phaeocystis pouchetii* from McMurdo Sound. Profiles of spectral irradiance through the ice column demonstrated that the irradiance environment of sea ice was vertically and horizontally heterogeneous, changing from blue-dominated to green-dominated with depth in the column, and varying from site to site depending on snow cover and ice algal patchiness. In response to reductions in irradiance, platelet ice microalgae consistently showed enhanced absorption of blue-green light relative to congelation ice microalgae. Samples of *P. pouchetii* from under the seasonal fast ice of McMurdo Sound also exhibited enhanced blue-green absorption relative to samples from open waters of the Ross Sea. The mean specific absorption coefficient (msac), for sea ice microalgae ranged between 0.0058 and 0.0097 sq m/(mg chl *a),* values characteristic of microalgae in green productive waters. For *P. pouchetii,* msac was greatest for samples taken from open water at the ice edge and decreased for samples taken from under the seasonal ice of McMurdo Sound. The quantum yield of photosynthesis for these microalgae is given, with no significant differences found between congelation ice and platelet ice algae. (Auth. mod.)

B-36944

Abyzov, S.S., Beliakova, L.A., **Ecological peculiarities of mycelial fungi from antarctic ice** [Ob ekologicheskikh osobennostiakh mitselial'nykh gribov iz tolshchi antarkticheskogo lednika], *Antarktika; doklady komissii,* 1987 No.26, p.157-160, In Russian. 25 refs.

Microbiological analysis of a core from Vostok Station disclosed a variety of species of mycelial fungi in a state of deep anabiosis contained in the ice at -55 C over a long period of time. A comparison of these microorganisms with samples from more temperate latitudes established their ability to grow in a wide temperature range. However, the ability to thrive at very low temperatures is peculiar to samples collected in Antarctica. It is concluded that this is due to anabiosis which allowed those microorganisms to maintain their biological characteristics and to adapt to extreme conditions before their entrapment in the ice.

B-36945

Zhuravlev, V.M., Spiridonov, V.A., **Biology of the antarctic euphausiid *Thysanoessa macrura* G.O. Sars from the Atlantic sector of the Antarctic** [K biologii antarkticheskoĭ evfauziidy *Thysanoessa macrura* G.O. Sars (po materialam iz vostochnoĭ chasti atlanticheskogo sektora Antarktiki)], *Antarktika; doklady komissii,* 1987 No.26, p.161-171, In Russian. Refs. p.170-171.

Analysis of age structure of *Thysanoessa macrura* collected in the Lazarev Sea in Mar. 1981, and in the Weddell Sea in Mar. and Oct. the same year, shows that maturity occurs at the end of the second and beginning of the third year of life, and that the population life cycle is completed in 2-2.5 years.

B-36946
Belopol'skiĭ, L.O., Krasovskiĭ, I.V., **Distribution of seabirds in the Bouvet Island area in winter 1982** [Raspredelenie morskikh ptits v raĭone ostrova Buve zimoĭ 1982 g.], *Antarktika; doklady komissii,* 1987 No.26, p.172-178, In Russian. 7 refs.

Charts and tables are presented and discussed of species distribution and population of seabirds, compiled from a study at 37 stations during the winter of 1982, in the Bouvet I. area, where 2290 birds of 9 species were counted. The predominant species is the Cape pigeon, while the Snow and Storm petrels, and the chinstrap penguin are found in considerably lower numbers. For the benefit of the fishing industry, it is suggested that the concentration of these birds could serve as an indicator of massive accumulations of krill in the subantarctic region studied.

B-36956
Garrison, D.L., Buck, K.R., Fryxell, G.A., **Algal assemblages in antarctic pack ice and in ice-edge plankton,** *Journal of phycology,* Dec. 1987 23(4), p.564-572, 37 refs.

Algal assemblages in ice and water in the Weddell Sea during the austral spring of 1983 at a receding ice edge are compared with a well-developed ice edge bloom. The dynamics of these blooms appear to be closely related to seasonal melting of sea ice. The high degree of similarity between ice and water column assemblages, the spatial and temporal patterns in the distribution and abundances of species, and preliminary evidence for the viability and growth of ice-associated species provide evidence for seeding from sea ice of some species in Antarctica. (Auth. mod.)

B-36957
Darling, R.B., Friedmann, E.I., Broady, P.A., ***Heterococcus endolithicus* sp. nov. (Xanthophyceae) and other terrestrial *Heterococcus* species from Antarctica: morphological changes during life history and response to temperature,** *Journal of phycology,* Dec. 1987 23(4), p.598-607, 35 refs.

Strains of *Heterococcus endolithicus* sp. nov., *H. pleurococcoides* Pitschmann, *H. caespitosus* Vischer, and *H. protonematoides* Vischer isolated from terrestrial habitats in Antarctica were studied in culture. Morphology of the algae changes with stage in life history. The characteristic branching patterns are not present in very young or old cultures. Filament formation is suppressed when cultures are grown outside their optimal temperature range. (Auth.)

B-36963
Testa, J.W., **Long-term reproductive patterns and sighting bias in Weddell seals *(Leptonychotes weddelli)*,** *Canadian journal of zoology,* May 1987 65(5), p.1091-1099, Refs. p.1098-1099.

The reproductive performance of tagged Weddell seals *(Leptonychotes weddelli)* was monitored at McMurdo Sound, from 1970 to 1984. An age-specific reproductive schedule revealed the major onset of pupping at age 6 years, and a mean age of first birth of 7.1 years. The average asymptotic pupping rate of 0.61 is reached by age 10. The cost of pupping in a given year is reflected in a 0.05 drop in the probability of pupping the following year. This cost is not evident in females over 7 years old, suggesting that postweaning condition affects newly mature females more than those that are fully mature. Annual adult reproductive rates ranged from 0.46 to 0.79, with a possible periodicity of 5 to 6 years. Simulations were conducted to determine the impact on reproductive estimates of sighting biases associated with seals having had at least one pup (Parous) or having pupped that season (With-Pup). Age at first reproduction as deduced from an age-specific pupping schedule is strongly affected by both forms of sighting bias, but bias in sighting Parous females was the more important. Estimates of adult reproduction were affected minimally. Comparisons of reproductive estimates with those of Weddell seals at Signy I. are discussed with regard to the effects of sighting biases. (Auth.)

B-36964
Hoberg, E.P., ***Reighardia sternae* (Diesing, 1864) (Pentastomida) from seabirds in Antarctica,** *Canadian journal of zoology,* May 1987 65(5), p.1289-1291, 19 refs.

Specimens of the pentastome *Reighardia sternae* (Diesing, 1864) are reported for the first time in avian hosts from Antarctica. Mature female specimens were found in a southern black-backed gull *(Larus dominicanus* Lichtenstein) (1 of 21 examined) while an immature female was found in a south polar skua *(Catharacta maccormicki* (Saunders)) (1 of 20). Species of *Reighardia* have not previously been reported among any of the Stercorariinae. The degree of development of individuals of *R. sternae* provided evidence that the life cycle of this pentastome could be completed on the breeding grounds of its hosts in the region of the Antarctic Peninsula. (Auth.)

B-36969
Arai, S., **Pigmentation of juvenile coho salmon with carotenoid oil extracted from antarctic krill,** *Aquaculture,* Nov. 15, 1987 66(3-4), p.255-264, 25 refs.

Pigmentation of the flesh of juvenile coho salmon *(Oncorhynchus kisutch)* in fresh water was investigated by feeding diets supplemented with an oil extracted from krill *(Euphausia superba).* The oil contained (3R,3'R)-astaxanthin diester as a main carotenoid. Small fish (80 g) fed the supplemented diet showed very little flesh pigmentation. However, marked pigmentation was observed when fish with an initial weight of approximately 180 g were reared on diets containing 7.2 mg astaxanthin/100 g diet for 4 weeks. The carotenoid content of flesh was about 0.2 mg/100 g and it consisted almost exclusively of astaxanthin. Fish fed a diet containing krill oil for 8 weeks retained most of the carotenoids laid down in the flesh throughout a following 24-week period on a non-carotenoid diet. (Auth. mod.)

B-36976
Stone, G.S., Hamner, W.M., **Humpback whales *Megaptera novaeangliae* and southern right whales *Eubalaena australis* in Gerlache Strait, Antarctica,** *Polar record,* Jan. 1988 24(148), p.15-20, 28 refs.

During surveys conducted Apr. 2-20, 1986, 103 humpback whales *Megaptera novaeangliae* and 8 right whales *Eubalaena australis* were sighted. The right whale sightings extend the southern limit of known distribution for the species. Humpback and right whale densities were respectively 0.22 (sd 0.23) and 0.01 (sd 0.06) whales per survey mile. Highest densities for both species were recorded inside bays, rather than in the relatively open water of Gerlache Strait. Both species were feeding on antarctic krill *Euphausia superba.* Twenty-three humpback and 4 right whales were identified individually using photographs of natural features. Also included are sighting records of 18 southern bottlenose whales *Hyperoodon planifrons.*

B-36981
Accorinti, J., **Marine resources. Algae: potential uses in pharmacology** [Recursos del mar. Algas: fuente potencial de nuevos fármacos], *Buenos Aires. Instituto Antártico Argentino. Publicación,* 1987 No.18, 133p., In Spanish with English, German and French summaries. Refs. p.93-110, 129-131.

On the basis of a review of worldwide literature, information is offered concerning extraction, isolation and biological valoration techniques, including some biogenetic aspects. Correlations are established between active metabolites and similar structures from ma-

rine seaweeds, particularly *Rhodophyceae* (red) and *Phaeophyceae* (bronw) microalgae. Convergent metabolic-filogenetic bridges and divergent evolutive derivations between the products of both classes are designated, including some of the primordial green microalgae. A list of the studied species is also presented as a function of the identified terpenoidal structures. A table showing algal species found in Argentine and antarctic/subantarctic waters, and comparable species listed in world literature as being potential producers of biologically active metabolites, is included.

B-36992

Siegel, V., **Age and growth of antarctic Euphausiacea (Crustacea) under natural conditions,** *Marine biology,* 1987 96(4), p.483-495, Refs. p.494-495.

Five species of antarctic euphausiid crustaceans from the Antarctic Peninsula and the southeastern Weddell Sea were studied. Life spans range from 2 years for *Euphausia frigida* to 6 years for the krill *Euphausia superba.* Growth in length and weight was calculated by non-linear regressions. No difference in growth of krill was observed between the 2 areas. Former opinions that differ are discussed. Seasonal growth was re-analyzed for the species *(Euphausia triacantha,* and a 3-year life span proposed. Male *Euphausia crystallorophias* have a shorter life span than females, while their growth rate is similar. A short description of the life cycle and generation time of each species is given. In general, antarctic euphausiids seem to remature and spawn at least twice and in some cases 3 times during their lifetimes, except for *E. frigida* which spawns only once. (Auth.)

B-36999

Petrov, IU.E., **Quantitative indicators of growth of soil algae in the area of Bellingshausen Station** [Kolichestvennye pokazateli razvitiia pochvennykh vodorosleĭ v raĭone stantsii Bellinsgauzen], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1984 Vol.79, p.87-90, In Russian. 3 refs.

Twenty-seven specimens of algae were collected and analyzed by light microscopy. They covered 0.14-18% (4.3% average) of the ground surface and 0.03-14% (1.7% average) of layers 5 mm deep. The largest quantities were found in humid spots at the bottom of ravines and on terraces; the fewest, on summits and hill slopes.

B-37000

Petrov, IU.E., Nikolaev, V.A., **Study of sea algae in the King George I. coastal area, near Bellingshausen Station** [Izuchenie morskikh vodorosleĭ litorali o-va King-Dzhordzh v raĭone stantsii Bellinsgauzen], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1984 Vol.79, p.90-94, In Russian.

In a survey of marine algae species distribution along the littoral of King George I., 4 zones are identified, according to the growth of various types of algae. The biomass of dominant species, in kg per sq m, is reported as follows: *Adenocystis utricularis,* 15.8; *Iridaea obovata,* 10; *Leptosomia simplex* and *Curdiea racowitzae,* 8; *Urospora penicilliformis,* 2.9; and *Porphyra endeviifolium,* 2.4.

B-37016

Smith, V.R., **Environment and biota of Marion Island,** *South African journal of science,* Apr. 1987 83(4), p.211-220, With Afrikaans summary. 103 refs.

Geologically, climatologically and biologically, Marion I. is typically sub-antarctic in character. The physical and biological features of the island are described and the special characteristics of the subantarctic region are highlighted by comparing it with the Antarctic and sub-Arctic. The isolation under which the island ecosystem evolved has resulted in a depauperate biota and made it susceptible to the introduction of alien plants and animals by man. Conservation issues pertaining to the island are discussed against the background of a recent proposal to construct a landing-strip there. (Auth.)

B-37031

Croome, R., ***Pinaciophora columna* n. sp., *P. tasmanica* n. sp. and *P. apora* n. sp., new Heliozoeans from Australia, and a report of *P. fluviatilis* Greeff from Antarctica,** *Archiv für Protistenkunde,* 1987 133(1/2), p.15-20, 11 refs.

Three new members of the heliozoean genus *Pinaciophora, P. columna, P. tasmanica* and *P. apora,* are described from manifestly freshwaters in Tasmania, Australia, and the presence of *P. fluviatilis* Greeff is recorded from waters adjacent to Antarctica, the Lützow-Holm Bay. (Auth. mod.)

B-37032

El-Sayed, S.Z., ed, **Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS newsletter, Vol.9, No.2,** College Station, Texas A and M University, Dec. 1987, 16p.

Discussions at the SCAR Group of Specialists on Southern Ocean Ecology meeting, held May 27-29, 1987, in Paris, are summarized as follows: the Group's Terms of Reference, which are outlined, were reviewed, and the Group decided to confine its attention to a broad overview of important approaches, themes and topics relevant to antarctic marine ecology; four research directions were identified, as were 4 ecological systems: sea ice, continental shelf, open ocean, and subantarctic islands. Highlights of the 1987 CCAMLR Committee meetings, held Oct. 26-Nov. 6 in Hobart, Australia, are given; additional details of the BIOMASS Executive meeting, held in Paris in June 1987, and covered in the letter's July, 1987, issue, are provided. Discussions included krill physiology, fish ecology, physical/chemical oceanography, and data processing. The Nov. 12-12, 1987, activities of a planning meeting for the 1988 SIBEX Acoustic Data Validation Workshop to be held in July 1988, are outlined. An account is given of the 5 sessions of the International Conference on Marine Biology of Antarctica, held Oct. 6-8 in Ravello, Italy which covered the marine ecosystem, biochemistry and physiology of cold adaptation, biology of *Euphausia superba,* perspectives in molecular biology in the marine ecosystem, and national efforts in the Antarctic, respectively. Further reviews include a BIOMASS Workshop on Phytoplankton/-Zooplankton Relationships and the meeting of the Working Group for the CCAMLR Ecosystem Monitoring Program. Other news items cover the cruises in the Antarctic planned in 1987/1988 and a list of future meetings.

B-37038

Cabrera, S., Montecino, V., Graf, M.E., **Primary productivity of phytoplankton from integrated water samples in the Bransfield Strait** [Productividad primaria en muestras integradas de fitoplancton del estrecho Bransfield], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.73-92, In Spanish with English summary. Refs. p.90-92.

Data are presented on the depth of the euphotic zone in relation to the biomass of phytoplankton (Chlorophyll *a),* mean extinction coefficient and C-14 primary production in the Bransfield Strait obtained in Jan.-Feb. 1985. The limit of the euphotic zone varied between 7.2 m and 58.1 m depth, with extinction coefficient values of -0.643/m to -0.079/m, respectively. The maximum mean extinction coefficient was observed in Fountain Bay, close to the Gerlache Strait. The depth integral of chlorophyll *a* was very highly correlated with surface chlorophyll *a* ($p<0.001$) but neither parameter correlated significantly with the column integral of primary productivity. Some probable explanations for this are discussed. In general, the results indicate considerable heterogeneity in the Bransfield Strait. Mean

chlorophyll *a* specific carbon fixation rates for different stations (integral assimilation numbers) varied inversely with chlorophyll *a* concentration. In dilute populations in waters with low extinction coefficient the integral assimilation number was ten times higher than in areas with dense phytoplankton and high mean extinction coefficient. It is considered that the growth rate of the dilute populations was correspondingly rapid. (Auth. mod.)

B-37039

Uribe, E., **Distribution of chlorophyll *a* in the Bransfield Strait during the austral summer 1985 (SIBEX-Phase 2)** [Distribución de clorofila *a* en el estrecho Bransfield durante el verano austral 1985 (SIBEX-Fase II)], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.93-106, In Spanish with English summary. 17 refs.

The study was conducted in the Bransfield Strait from Jan. 24 to Feb. 12, 1985, on board the M/N *Capitán Luis Alcázar.* The main objective of this investigation was to study the phytoplankton distribution. A total of 27 oceanographic stations were occupied. The results show a slight change in the pattern of chlorophyll *a* distribution, as compared with FIBEX and SIBEX-Phase 1 cruises, which were characterized by a low phytoplanktonic biomass in the center of Bransfield Strait, product of intense grazing by krill and salps. In SIBEX-Phase 2, the chlorophyll *a* distribution showed an area with high phytoplanktonic biomass, 20.0 mg/cu m, between the northern part of Gerlache Strait and the waters surrounding Nelson and King George islands. (Auth.)

B-37040

Castillo P., J., Guzman F., O., Lillo, V., S., Pineda, P., **Biomass and distribution of krill *(Euphausia superba)* in the Bransfield Strait during SIBEX-II, 1985, in relation to some oceanographic parameters** [Biomasa y distribución de krill *(Euphausia superba)* en el estrecho Bransfield, durante el verano austral 1985 (SIBEX-II), en relación con algunas variables oceanográficas], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.107-133, In Spanish with English summary. Refs. p.132-133.

The estimate of krill biomass in Bransfield Strait was 1,700,000 tons with a 31.5% of error. This biomass was distributed principally in the coastal sectors and in the eastern extreme of the strait, between 10 and 140 meters depth. The relation between physical oceanographic conditions and geographic distribution of krill was analyzed. The fraction of the resource situated in the center and the eastern entrance of Bransfield Strait was associated with temperatures below 0 C, while the fraction situated in the west was detected in less cold waters. The dissolved oxygen measured in the sectors with krill was 8.0 cu cm/cu dm and the salinity fluctuated between 34.1% and 34.5 per mill. Based on 28 fishing hauls and the acoustic information, it was established that the individuals of a smaller size were localized in the eastern entrance and in the center of Bransfield Strait in aggregations of high density. (Auth.)

B-37042

Czeczuga, B., Xavier-Filho, L., **Investigations on carotenoids in lichens. 10. Luteoxanthin and Apo-12'-Violaxanthal in lichens from Antarctica,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.151-155, With Spanish summary. 13 refs.

By column and thin-layer chromatography the presence of the carotenoids: beta-carotene, beta cryptoxanthin, zeaxanthin, canthaxanthin, phoenicoxanthin, astaxanthin, adonixanthin, lutein epoxide, mutatoxanthin, violaxanthin, luteoxanthin, neoxanthin, rhodoxantin and beta-apo-12'violaxanthal was determined in 7 antarctic lichen species. The total carotenoid content ranged from 4.26 microgram/g dry weight in *Himantormia lugubris* to 15.64 microgram/g dry weight of *Mastodia tesselata.* (Auth.)

B-37043

Sallaberry, M., Valencia, J., Pincheira, B., Lazzaro, H., **Results of Chilean antarctic seabird banding program: recoveries from the South Shetland Islands** [Resultados del programa chileno de anillado de aves antárticas: recapturas en las islas Shetland del Sur], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.157-165, In Spanish with English summary. 15 refs.

The development of the Chilean antarctic seabird banding program is reported, and the register of resighted birds on South Shetland Is. is given. Recapture of Giant Petrel, Brown Skua and Sheathbill banded by other researchers is also reported. The program is directed mainly to the study of the 3 *Pygoscelis* penguins breeding in the area. Nevertheless, *Oceanites oceanicus* and *Fregetta tropica* were also considered. The recovery data of penguins confirm that a significant proportion of birds return every season to the nesting site where they were born. (Auth. mod.)

B-37044

Schlatter, R.P., **Sightings of marine mammals during SIBEX-2 in Bransfield Strait and adjacent waters** [Avistamiento de mamiferos marinos durante SIBEX-Fase II en el estrecho Bransfield y aguas adyacentes], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.167-174, In Spanish with English summary. 14 refs.

Cetaceans and pinnipeds were censused during SIBEX-Phase II 1985, from the M/N *Alcázar.* Counts tend to indicate that both cetaceans and pinnipeds, but mainly the antarctic fur seal, have increased their populations compared to previous estimates. Cetaceans have not increased significantly. An association between krill distribution and that of cetaceans and pinnipeds could be shown qualitatively. This association was statistically not proven due to insufficient observation of predator and prey. (Auth. mod.)

B-37045

Gallardo, V.A., **Analysis of antarctic conservation areas with emphasis on marine areas,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.177-184, With Spanish summary. 7 refs.

Present conservation areas within the Antarctic Treaty System (ATS) are analyzed by numerical classification. Emphasis is placed on the problem of generating marine conservation areas. The classification is based on 12 objective variables for both the Specially Protected Areas (SPAs) and the Sites of Special Scientific Interest (SSSIs). Jaccard's qualitative index of similarity and the unweighted arithmetic average clustering are applied. Results reveal important inconsistencies in the system of generating conservation areas in the Antarctic, particularly as regards areas with marine components. Corrections are suggested. (Auth.)

B-37047

SCAR/SCOR/IABO/ACMRR, **Post-SIBEX fish data evaluation workshop: Phase 1. Validation, Cambridge, U.K., 6-17 Oct. 1986,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* May 1987 No.52, 46p., 3 refs.

After an introduction by the conveners reviewing the history of the workshop, decisions on its structure, primary aims and objectives,

an introduction to the BIOMASS data base is presented. The procedures for validation of the data are outlined, and the reasons for the present data formats explained, as is the use of relational data base and the Oracle'OQL software. Validation of data, comparison of identified and unidentified specimens and compilation of other fish data relevant to SIBEX data sets are discussed. An outline of intersessional work, with titles, details, persons responsible, deadlines and comments, is presented. Questions to be answered during the next fish workshop are reviewed, and queries directed to the Post-SIBEX Physical Oceanography Workshop are listed. Preparation for the Aug. 1987 fish data evaluation workshop, including participants and funding, is considered. Four projects are outlined for future recruitment surveys in the southern ocean under the auspices of CCAMLR; future work under SCAR, and the future of the BIOMASS Data Centre are discussed. Six annexes, with participants and addresses, papers tabled, summary of SIBEX cruise and fish data loaded in BIOMASS database, guidance notes for requesting information on the early stages of antarctic fish, glossary of acronyms, and a bibliography of publications on early history stages of antarctic fish, respectively, are included.

B-37050

Reichardt, W.T., **Burial of antarctic microalgal debris in bioturbated deep-sea sediments,** *Deep-sea research,* Oct. 1987 34(10A), p.1761-1770, 44 refs.

In two sediment samples from the antarctic ocean (Weddell Sea) at 2280 and 1570 m water depth the upper 8-10 cm contained considerable amounts of macroalgal fragments larger than 1 mm (22.9 and 20.8 g/sq m of ash-free dry weight), derived from brown and red macroalgae. With C:N ratios (>17) being rather typical for initial stages of bacterial colonization and transformation to detritus, the thallus fragments served as a matrix for epiphytic bacteria. The occurrence of low densities of bacteria on the algal surfaces therefore could be interpreted as the result of grazing by a polychaete-dominated infauna. The input of large macroalgal fragments locally into deep-sea sediments could help modulate the extreme seasonality of benthic energy flow which is thought to prevail at high latitudes. (Auth.)

B-37052

O'Neill, J.G., White, M.G., Sims, T.A., Barber, D.L., **Inflammatory response of the antarctic silverfish, *Pleuragramma antarcticum* Boulenger, 1902, to a plerocercoid (species unknown) infestation,** *Journal of fish biology,* 1987 31(Suppl.A), p.231-232, 2 refs.

Six juvenile specimens of *Pleuragramma antarcticum,* caught near King George I., were found to be parasitized by the plerocercoid stage of a pseudophyllidean cestode. A similar 100% incidence of infection was noted by Bartsch (1985) in her study of *P. antarcticum.* The infestation ranged from 4 to 17 plerocercoids per fish, with each of the 2-2.5 mm long parasites associated loosely with the stomach or intestinal mesentery of the host. The host response to the parasite, a discrete inflammatory sheath that was not visible to the naked eye, was observed by light and scanning electron microscopy.

B-37053

Grygier, M.J., **Antarctic records of asteroid-infesting Ascothoracida (Crustacea), including a new genus of Ctenosculidae,** *Biological Society of Washington. Proceedings,* Dec. 31, 1987 100(4), p.700-712, Refs. p.711-712.

The following Ascothoracida parasitizing antarctic asteroids are described and illustrated: an immature female *Dendrogaster* sp. cf. *antarctica* Grygier, and females and brooded offspring of *Gongylophysema asetosum,* n. gen. and sp., all parasitic in *Odontaster validus* Koehler; several females and males of *D. usarporum,* n. sp., from *Porania antarctica glabra* Sladen. Females of both species of *Dendrogaster* have setose thoracopods, a new morphological feature for this genus. *Gongylophysema* is the most apomorphic genus of the Ctenosculidae and has numerous similarities with the dendrogastrid genus *Ulophysema.* Its embryological development omits the nauplius, and the ascothoracid larva's medial penis originates as paired embryonic limb buds, a finding with implications for the entire Ascothoracida and Cirripedia. The sexes are separate by ascothoracid larva I. (Auth. mod.)

B-37054

Child, C.A., **New and little known pycnogonida from antarctic and subantarctic waters,** *Biological Society of Washington. Proceedings,* Dec. 31, 1987 100(4), p.902-916, 13 refs.

Five new species, *Ascorhynchus antipodus, A. cooki, Cilunculus spinicristus, Eurycydeantarctica,* and *Cheilopallenegigantea,* and one rare species, *Oropallene dimorpha* (Hoek), were sorted from various antarctic collections taken from localities southwest of New Zealand, off the Antarctic Peninsula, and the Ross Sea. The new species are compared with known species of the genera and their distribution is given. (Auth.)

B-37055

Bayer, F.M., Stefani, J., **New and previously known taxa of isidid octocorals (Coelenterata: Gorgonacea), partly from antarctic waters,** *Biological Society of Washington. Proceedings,* Dec. 31, 1987 100(4), p.937-991, Refs. p.990-991.

The classification and taxonomic characters of the gorgonacean family Isididae are discussed, and a revised key to world genera is presented. The Austral genus *Primnoisis* Studer [and Wright] and its type species *P. antarctica* (Studer) are discussed on the basis of material taken by HMS *Challenger* and by R/V *Hero,* and a n. sp., *P. mimas,* is described from South Georgia. The genus *Echinisis* Thomson and Rennet and its type species *E. spicata* (Hickson) are discussed on the basis of material taken by USARP, and 3 new species, *E. eltanin, E. vema,* and *E. persephone* are described. The genus *Scleri-sis* Studer is discussed and its type species, *S. pulchella* Studer, is redescribed on the basis of a specimen obtained by USARP. *Ceratoisis ramosa* Hickson is redescribed and the species reassigned to the genus *Chathamisis* Grant. A new genus and species, *Australisis sarmentosa,* are established for abundant subantarctic material obtained by USARP. Five new finds of *Ceratoisis microspiculata* Molander are reported from antarctic localities, variation among the specimens described, and the species assigned to a new genus *Tenuisis.* (Auth. mod.)

B-37057

Harper, P.C., **Feeding behavior and other notes on 20 species of Procellariiformes at sea,** *Notornis,* Sep. 1987 34(3), p.169-192, 30 refs.

Between Jan. 1965 and Mar. 1967, 4926 observations were made, from the research ship USNS *Eltanin,* on 20 species of petrel feeding in the southern ocean. Most observations were made at night while the ship was stopped on oceanographic research stations. Observations were made possible by bright decklights, following birds with the powerful bridge lights, or under moonlight. Eleven feeding methods were distinguished. Most common were surface seizing (49.1%: used by 14 species), dipping (25.2%: 9 species), and surface plunging (c.6%: 6 species). Seven species foraged entirely at night, and 5 fed by day only. Food recorded was chiefly crustaceans and squid. The submergence time and prey-handling time for some species are also given. (Auth.)

B-37062

Semenova, S.I., Fedulov, P.P., **Composition and distribution of phytoplankton in different modifications of antarctic waters near Bouvet Island,** *Oceanology,* Apr. 1987 26(5), p.616-620, Translated from Okeanologiia 26(5), 1986. 12 refs.

Differences in the distribution of phytoplankton in different modifications of antarctic waters are described on the basis of materials from a 1982 multidisciplinary survey in the vicinity of Bouvet I. Diatom algae were predominant in both number of species and abundance in the phytoplankton of both the antarctic circumpolar current (ACC) and the Weddell Sea. Diatoms developed to the greatest extent in the water of the ACC, whereas increased growth of peridinians, flagellates and coccolithophores was noted in Weddell Sea water. Differences in the makeup and numbers of phytoplankton in the Weddell Sea and the ACC result from variation in the hydrologic structure and differences in the seasonal state of phytocoenoses in different latitude zones. (Auth.)

B-37073

Kamenev, V.M., **Ornithofauna of Fildes Peninsula, King George Island (South Shetland Islands)** [Ornitofauna p-ova Faĭlds, o-va King-Dzhordzh (IUzhnye Shetlandskie ostrova)], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.72-80, In Russian. 7 refs.

Investigations conducted at Bellingshausen Station from Feb. 26, 1981, to Mar. 24, 1982 during the 26th Soviet Antarctic Expedition, disclosed the following 12 species of birds nesting on King George I.: *Pygoscelis adeliae, P. papua, P. antarctica, Macronectes giganteus, Daption capensis, Oceanites oceanicus, Fregetta tropica, Stercorarius skua, Larus dominicanus, Sterna vittata, Phalacrocorax atriceps,* and *Chionis alba.* Details of their nesting habits and distribution are given. Of the non-nesting birds on the island, the following were observed: *Aptenodytes forsteri, Eudyptes chrysolophus, Fulmarus glacioloides, Thalassoica antarctica, Pagodroma nivea,* and *Stercorarius pomarinus.*

B-37084

Covas, G., Abiusso, N.G., **Chemical composition and digestibility of *Poa flabellata (Tusac),* from the Falkland Islands** [Composición química y digestibilidad de *Poa flabellata (Tusac),* gramínea procedente de las Islas Malvinas (Gran Malvina y Celebroña)], *Sociedad Científica Argentina, Buenos Aires. Anales,* Jan.-Dec. 1986 Vol.216, p.25-35, In Spanish with English summary. 12 refs.

Analyses of different parts of *Poa flabellata (Tusac)* from Falkland Is. are reported. The chemical composition, following the Kellner classification of forages, shows that some portions of the younger plants are of excellent quality, with low cellulose content (19.96%-21.71%) and high total protein percentage and digestibility. Experimental data of *in vitro* digestibility confirm the chemical results obtained; in younger plants of *Poa flabellata (Tusac)* they were comparable to those of *Medicago sativa L.* (Auth. mod.)

B-37085

Hubold, G., Hempel, I., **Seasonal variability of zooplankton in the southern Weddell Sea,** *Meeresforschung,* 1987 31(3-4), p.185-192, 14 refs.

Zooplankton variability between summer and winter was studied in relation to water mass distribution in a 100x100 km station grid in the southern Weddell Sea at 73S/19W. Based on Bongo net hauls between 200 m or 500 m and the surface, abundances of 18 frequently occurring zooplankton taxa, including copepods, appendicularians, larval fish *Pleuragramma antarcticum,* and developmental stages of *Euphausia superba, Euphausia crystallorophias,* and *Thysanoessa macrura* were analyzed. Variability of zooplankton was high in late summer. Larval krill, virtually absent in Jan. occurred at mean abundances of more than 1000 individuals/100/cu m in Feb., when numbers of other herbivorous zooplankton were 2.2 times lower than in Jan. In Oct.-Nov., abundances of surface zooplankton were about 10 times lower than Jan. values. The entire water column on the shelf contained approximately five times less zooplankton in late winter than the upper 200 m in summer. (Auth.)

B-37086

Wheeler, G.A., **Taxonomy of *Carex* sect. *Abditispicae* sect. nov. (Cyperaceae) from austral South America,** *Systematic botany,* Oct.-Dec. 1987 12(4), p.572-585, 25 refs.

Carex sect. *Abditispicae* Wheeler, described from southern South America and the Falkland Is., belongs in subg. *Carex.* It is comprised of 4 species: *C. macrosolen* Steudel which was formerly placed in sect. *Physocarpae* (Drejer) L. Bailey subsect. *Lupulinae* (Tuckerman) Kük.; *C. acaulis* Urv. formerly placed in sect. *Spirostachyae* (Drejer) L. Bailey; *C. subantarctica* Speg., previously unplaced, and a new species, *C. pisanoi.* Section *Abditispicae* is distinguished from all others by several characteristics, which are described. Habitats are moist to wet grasslands, swales, spring seepages, "bogs" and swamps, mossy vega, lake shores, and wet sands and gravels by the sea. (Auth.)

B-37089

Rodgers, M.E., **Thermal stability of myosin rod from various species,** *Biochemistry,* Dec. 29, 1987 26(26), p.8703-8708, 40 refs.

The radius of gyration and fraction helix as a function of temperature have been determined for myosin rod from 4 different species: rabbit, frog, scallop, and antarctic fish. Measurements from sodium dodecyl sulfate gel electrophoresis indicate that all particles have the same molecular weight (about 130K). All fragments are nearly 100% *alpha*-helical at low temperatures (0-5 C). The melting profiles for each are qualitatively similar in shape, but their midpoints are shifted along the temperature axis. Corresponding radius of gyration vs temperature profiles for each species are shifted to lower temperatures (approximately 5-8 C) with respect to the optical rotation melting curves. From plots of radius of gyration vs fraction helix, a marked drop was found in the radius of gyration (from 43 to about 34 nm) with less than a 5% decrease in fraction helix for rabbit, frog, and antarctic fish rods. Results indicate hinging of the myosin rod of each species. The thermal stabilities of the myosin rods shift in parallel with the working temperature of their respective muscles. (Auth. mod.)

B-37091

Chang, H.M., **Studies on the spinnability of antarctic krill muscle proteins treated with alkali,** *Japanese Society for Food Science and Technology. Journal (Nippon shokuhin kogyo gakkaishi),* 1987 34(3), p.190-196, 21 refs.

A process for preparing spun protein fibers from antarctic krill *(Euphausia superba)* muscle is described. Na-alginate, NaOH solution and deionized water were mixed to make spinning dopes which were extruded into a calcium coagulation solution to produce the fibers. The relationships between the composition of dopes and their spinnability were studied. Spinnability of dopes were classified into 5 grades and dopes with good spinnability were those which could be taken up at a velocity of 35 m/min when extruded into a calcium coagulation solution (pH 5 or 7.6). The nature, pH and temperature of the coagulation solution also affected the spinnability of the dopes. The optimum conditions for obtaining the most adequate fibers were 3.8% (w/v) of CaCl2 and at 15-25 C of the coagulation solution. At 45 C, there was a decrease in the fiber strength. Protein recovery fiber-making from krill's muscle was about 70%. (Auth.)

B-37092

Chang, H.M., **Spinnability of antarctic krill muscle proteins and the behavior of spinning dope,** *Japanese Society for Food Science and Technology. Journal (Nippon shokuhin kogyo gakkaishi),* 1987 34(3), p.197-202, 20 refs.

In order to find the most adequate approach to prepare spinning dope, the relationships between the spinnability and the major subunit contents of antarctic krill muscle proteins in various spinning dopes were studied with SDS-polyacrylamide gel electrophoresis and gel filtration. Dope which showed good spinnability was prepared at 48 C during the mixing process and the most adequate concentration of NaOh was found to be 0.4% (w/w). The elution pattern of raw krill muscle proteins showed 3 peaks, but it was altered by Na-alginate. Results show that there was a complex formation between krill muscle proteins and anionic polysaccharides as they were homogenized during the mixing process. (Auth. mod.)

B-37093

Phan, V.N., Gomes, V., Suzuki, H., Passos A.C.R., M.J., **Karyotypes of two antarctic fishes, *Notothenia gibberifrons* and *Notothenia coriiceps neglecta*,** *Japanese journal of ichthyology (Gyoruigaku zasshi),* Feb. 20, 1987 33(4), p.384-387, 10 refs.

The chromosomes of two species of antarctic fishes, *Notothenia (Gobionotothen) gibberifrons* and *N. (Notothenia) coriiceps neglecta,* were prepared by the air-drying method at Arctowski Station during 1984-1985 summer. For *N. (G.) gibberifrons* the diploid number is 2n=46 consisting of 2 metacentric (m) pairs, 1 submetacentric (sm) pair and 20 telocentric (t) or subtelocentric (st) pairs. For *N. (N.) coriiceps neglecta* the diploid number is 2n=22 consisting of 9 m pairs, 1 sm pair and 1 st pair. Some aspects of karyological evolution of these fishes are discussed. (Auth.)

B-37094

Suzuki, M., Horii, T., Kikuchi, R., Ohnishi, T., **Purification of laminarinase from antarctic krill *Euphausia superba*,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* Feb. 1987 53(2), p.311-317, 17 refs.

A purified laminarinase preparation was obtained from the antarctic krill *Euphausia superba* through successive chromatographies. A purified laminarinase preparation showed a single protein band on disc electrophoresis. Its molecular weight was estimated to be 65,-000-70,000. The optimum pH of this enzyme was between 4.3-5.0 and the enzyme was stable until 45 C on heating for 10 min at pH 5.0 The enzyme hydrolyzed laminaran and laminarioligosaccharides except laminaribiose. The amounts of reducing sugars produced from laminaran at the initial stages of the reaction with this enzyme considerably surpassed the amounts of liberated glucose. The rate of hydrolysis on the periodate-oxidized and reduced laminaran by this enzyme was comparable to that on untreated laminaran. The enzyme split laminaran into yield glucose and laminarioligosaccharides. Results indicate that the enzyme is endotype. (Auth. mod.)

B-37096

Wu, B., Huang, F., Zhao, J., **On the occurrence of tunicates in the antarctic Great Wall Bay,** *Acta zoologica sinica,* 1987 33(2), p.192-193, In Chinese.

Biological investigations are discussed which were carried out at Fildes Peninsula from Great Wall Station, installed in Dec. 1984. The presence of the following fauna among the findings is reported: *Protochordata, Ascidiacea, Synascidia, Enterogona, Clavelinidae,* and *Distaplia cylindrica (Lesson).* Description of the latter, and illustrations of its colony, zooid and larva, are presented.

B-37098

Price, H.J., Boyd, K.R., Boyd, C.M., **Omnivorous feeding behavior of the antarctic krill *Euphausia superba*,** *Marine biology,* 1988 97(1), p.67-77, Refs. p.76-77.

Feeding experiments were conducted at Palmer Station from Dec. 1985 to Feb. 1986 to examine the potential role of copepod prey as an alternative food source for *Euphausia superba.* Copepod concentration, copepod size, phytoplankton concentration, the duration of krill starvation and the volume of experimental vessels were altered to determine effects on ingestion and clearance rates. *E. superba* may have a distinct mechanism for capturing copepods, perhaps through mechanoreception. Although the observed clearance rate of 1055 ml/krill/h indicates that krill can feed very efficiently on copepod prey, such feeding would meet less than 10% of their minimum metabolic requirements at the "typical" copepod concentrations reported for antarctic waters. However, substantial energy could be gained if krill fed on the patches of high copepod concentrations occasionally reported during the austral summer, or if krill and copepods were concentrated beneath the sea ice during the winter or spring months. The results, indicating efficient feeding on zooplankton and higher clearance rates on phytoplankton than previously believed, represent a step towards balancing the energy budget of *E. superba* in antarctic waters. (Auth. mod.)

B-37099

Suh, H.-L., Nemoto, T., **Morphology of the gastric mill in ten species of euphausiids,** *Marine biology,* 1988 97(1), p.79-85, 21 refs.

SEM observation revealed the detailed morphology of the gastric mill in 10 species of euphausiids, *Bentheuphausia amblyops, Thysanopoda acutifrons, Meganyctiphanes norvegica, Pseudeuphausia latifrons, Euphausia superba, Tessarabrachion oculatum, Thysanoessa longipes, Nematoscelis microps, Nematobrachion boopis,* and *Stylocheiron maximum.* The well-developed gastric mill of euphausiids consists of a pair of cluster spines and a pair of lateral teeth displaying great diversity in morphology. It is suggested that there are 3 categories of gastric mill and filter-press (gland filter) within euphausiids. One is the well-developed gastric mill with filter-press of *B. amblyops;* a second is the well-developed gastric mill of *M. norvegica, T. oculatum, E. superba, P. latifrons* and *T. longipes;* and the third is the gastric mill without lateral teeth of *T. acutifrons, N. microps, N. boopis* and *S. maximum.* (Auth.)

B-37104

Engelskjön, T., **Botany of Bouvetöya, South Atlantic Ocean. II. The terrestrial vegetation of Bouvetöya,** *Polar research,* Dec. 1987 5(2), p.129-163, 38 refs.

Bouvetöya, the northernmost land in the maritime antarctic, has a climate typical of oceanic islands south of the Antarctic Convergence, and a non-vascular vegetation of maritime antarctic composition and structure. Mean vegetation temperatures during the growing season are from +1 to +4.5 deg C on the low ground, whereas elevations above 200 m a.s.l. are more prone to freezing and show regular diurnal freeze/thaw cycles. Radiative heating of the ground is important in some well drained lichen communities with a northward aspect, but generally the mean diurnal temperatures registered in the superficial part of substratum and vegetation are low because of the prevailing cloudiness and high windspeeds. Some geothermally heated communities are described. The soil reaction ranges from slightly acid on silicic lava and leached basalt ground, to alkaline on calcite-bearing pyroclastic rocks, with a correspondingly different vegetation. The main plant communities of Bouvetöya are documented by quadrat analyses, and a classification is proposed. Local distribution patterns of 26 cryptogamic species are discussed and related to soil chemistry and elevation, as well as to the time elapsed for their establishment and the development of communities undisturbed by volcanism, landslides, glacierization, and animal influence. (Auth.)

B-37106
Harwood, J., Croxall, J.P., **Assessment of competition between seals and commercial fisheries in the North Sea and the Antarctic,** *Marine mammal science,* Jan. 1988 4(1), p.13-33, Refs. p.29-33.

Most of the exploited fish stocks in the North Sea are also used as a food supply by a number of seal species; the same is true for some fish and invertebrate stocks in the Antarctic—although the fisheries there are, at present, much smaller than those in the North Sea. The information needed for a critical assessment of such interactions is reviewed. Using existing techniques it is possible to estimate the quantity and size-classes of each fish or invertebrate species consumed by seals and to compare this with the commercial catch. If fishing mortality is known, these estimates can be used to calculate the level of mortality imposed by the seals. However, a realistic evaluation requires information on the distribution and movements of the fish, the seals' feeding effort, and the fisheries effort in time and space. At present it is difficult or impossible to obtain this information, but recent technological developments in telemetry equipment will soon make it feasible. (Auth. mod.)

B-37107
Bonner, W.N., **What shall we call the Weddell and Ross seals,** *Marine mammal science,* Jan. 1988 4(1), p.75-77, 7 refs.

Allowing that the Linnean names of the Weddell and Ross seals are almost always written nowadays as *Leptonychotes weddelli* and *Ommatophoca rossi,* a review is presented of the history of references to and descriptions of these seals. It is concluded that under Article 33 of the *Code of Zoological Nomenclature* the correct specific names for Weddell and Ross seals are, respectively, *weddellii* and *rossii.*

B-37109
Bock, I.R., **Australian species of *Ephydrella* and *Setacera* (Diptera: Ephydridae),** *Invertebrate taxonomy,* 1987 1(2), p.155-166, 19 refs.

The genus *Ephydrella* Tonnoir & Malloch contains 4 Australian species: *acrostichalis* (Malloch), *breviseta* (Malloch), *marshalli,* sp. nov., and *tasmaniae,* sp. nov. The larvae of the former 3 species are associated with marine algae of the genus *Cladophora.* Six other species of *Ephydrella* are also known, from New Zealand and Macquarie I. One species of *Setacera* Cresson, *S. breviventris* (Loew), occurs in Australia. (Auth.)

B-37114
Croxall, J.P., North, A.W., **Fish prey of Wilson's storm petrel *Oceanites oceanicus* at South Georgia,** *British Antarctic Survey. Bulletin,* Feb. 1988 78, p.37-42, 16 refs.

The first quantitative data on fish eaten by Wilson's storm petrels were obtained from identification and measurement of a small collection of otoliths in samples regurgitated by adults feeding chicks at South Georgia. All identifiable fish were myctophids with *Protomyctophum normani* predominating and *P. bolini* the only other species identified. Specimens were estimated to be 63-84 mm in total length (i.e. adults) and 1.8-3.9 g in weight. How Wilson's storm petrels catch such relatively large fish is discussed and their fish diet is compared with that of other storm petrels. (Auth.)

B-37115
Burn, A.J., Lister, A., **Activity patterns in an antarctic arthropod community,** *British Antarctic Survey. Bulletin,* Feb. 1988 78, p.43-48, 12 refs.

The activity patterns of terrestrial arthropods were investigated in a maritime antarctic community over a 9-day period during Mar. 1980. Only two species were trapped in sufficient numbers to show diurnal patterns of activity, the predatory mite *Gamasellus racovitzai* and the collembolan *Cryptopygus antarcticus.* Whereas *C. antarcticus* showed a peak in activity during the day, and a positive relationship between activity and temperature, *G. racovitzai* had maximum activity around midnight and a negative correlation with temperature over the period of study. Activity of another collembolan, *Parisotoma octooculata,* showed no clear circadian pattern. These observations on field activity are discussed in relation to previous laboratory studies on the effects of temperature on these species. It is suggested that despite overlaps in food selection by the two Collembola, there is unlikely to be temporal separation of activity on the basis of resource partitioning in such antarctic terrestrial ecosystems. *G. racovitzai,* by being active at night, may exploit the low activity of its principal prey species then and thereby improve its capture efficiency. (Auth.)

B-37117
Delany, S.N., Edwards, D.V., Williams, T.D., **Brown-hooded gull *Larus maculipennis:* first record for South Georgia,** *British Antarctic Survey. Bulletin,* Feb. 1988 78, p.53-54, 6 refs.

The various bird characteristics and procedures used to identify this gull are described: size, coloration, wing shape and size, flight habits; comparison with other live birds; reference to bird manuals; and an orderly elimination of birds which this bird was not.

B-37119
Sushin, V.A., Samyshev, E.Z., Gaĭdamak, A.I., **Significance of infusoria in antarctic plankton communities,** *Oceanology,* June 1986 (Pub. June 87) 26(6), p.740-744, Translated from Okeanologiia. 22 refs.

The main mass of infusoria in the Atlantic and Indian Ocean sectors of the Antarctic is represented by the genus *Strombidium* and the tintinnids, forms less than 50 micron prevailing in their size range. In Feb.-Mar. 1984 the average biomass of protozoans in the Atlantic sector was 11.4 mg/cu m in the 0-100 m layer, and in the Indian sector it was 18.3 in Dec. 1983 and 16.2 in Feb. 1984 Maximum concentrations (from 100 to 300 mg/cu m) were registered in areas of stabilization of currents under the impact of the topogenic effect. In spite of the relatively low biomass the functional role of infusoria in plankton communities proved high: they accounted for 43-51% of the total zooplankton requirements, 47-56% of its assimilation, and 54-64% of its production. (Auth.)

B-37120
Kuznetsova, I.A., Neuronov, A.M., **Goose barnacle *Lepas australis* in fouling subantarctic waters,** *Oceanology,* June 1986 (Pub. June 87) 26(6), p.763, Translated from Okeanologiia. 2 refs.

The aim of this study was to analyze the growth and development of *Lepas australis* at low temperature. Material was collected during a cruise of the R/V *Mstislav Keldysh* at 7 points of a study area between 47-50S and 25-27E. Analysis of *L. australis* age and size structure revealed an interesting pattern. At the southern point (50S), characterized by the lowest average temperature (4.1 C), only cyprids in limited quantities were found. The presence of cyprids and variously sized specimens of *L. australis* in buoy fouling is evidence of the prolonged settlement of the larvae. The marked lag in the growth of *Lepas* at southern points of the study area, with rather uniform distribution of phytoplankton in this region, can be explained by the lower temperature.

B-37121
Mühlenhardt-Siegel, U., **Some results on quantitative investigations of macrozoobenthos in the Scotia Arc (Antarctica),** *Polar biology,* 1988 8(4), p.241-248, 30 refs.

Abundance and biomass of macrozoobenthos off South Orkney Is., Elephant I. and the Antarctic Peninsula were studied by grab

sampling in Nov./Dec. 1984 and Feb. to Apr. 1985. Polychaetes, molluscs and crustaceans dominate in abundance, echinoderms and polychaetes in biomass. Differences in abundance and biomass were observed between the northern and south-western shelf areas of the Peninsula. Mean individual weight (B/N) is rather high. Biomass and B/N are not depth dependent within the range 60 to 850 m. The importance of the infauna is stressed. (Auth.)

B-37122

Horner, R.A., Syvertsen, E.E., Thomas, D.P., Lange, C., **Proposed terminology and reporting units for sea ice algal assemblages,** *Polar biology,* 1988 8(4), p.249-253, Refs. p.252-253.

Many terms and units are used to describe the algae associated with sea ice. Most of these terms are open to misinterpretation and have been frequently misused. The use of a number of different units when reporting on experimental studies makes it difficult, if not impossible, to compare studies done by different investigators. In an attempt to avoid these ambiguities and to make comparisons easier, some standard terms and reporting units that should be used when discussing ice algal assemblages are suggested. (Auth.)

B-37123

Smith, V.R., **Production and nutrient dynamics of plant communities on a subantarctic island,** *Polar biology,* 1988 8(4), p.255-269, Refs. p.268-269.

Studies of plant standing crop and of the nutrient concentrations in precipitation, soils and plants have enabled an assessment of the inter- and intra-system nutrient flows for 5 plant communities at Marion I. These communities, which are representative of those occupying more than 90% of the island's lowland (below 300 m above sea level) were: a fjaeldmark on a rocky plateau (dominated by the cushion plant *Azorella selago),* an open fernbrake and closed fernbrake (both dominated by the fern *Blechnum penna-marina)* and two mire-grasslands (on very wet peats and dominated by graminoid and bryophyte species). Annual net primary production (ANP) at the 5 communities was high and substantial quantities of nutrients were taken up annually by the vegetation. N was the element taken up from the soil in the largest quantities, despite the fact that instantaneous values of available N pools were exceptionally low. Either K or Ca was taken up in the second largest amount. Net quantities of nutrients translocated into the annual aboveground growth of vascular plants were, except for K and Na, greater than the seasonal mean standing stocks in the aerial biomass. Net translocation estimates ignored leaching losses from the biomass. Nutrient costs of the ANP for the mire-grassland communities were especially low, mainly because of low requirements for Ca and Mg. In view of the small soluble and available pools of some nutrients (especially N and P) and the substantial nutrient requirement for ANP, it is concluded that net nutrient mineralization in decomposition and nutrient absorption by the vegetation are closely coupled. (Auth. mod.)

B-37124

Copestake, P.G., Croxall, J.P., Prince, P.A., **Use of cloacal sexing techniques in mark-recapture estimates of breeding population size in Wilson's stormpetrel *Oceanites oceanicus* at South Georgia,** *Polar biology,* 1988 8(4), p.271-279, 15 refs.

Many stormpetrel species breed in habitats where their populations cannot be estimated by direct counts of burrows or birds; mark-recapture experiments have been confounded by the presence of many wandering non-breeders. With a population of Wilson's stormpetrel *Oceanites oceanicus* at Bird I., South Georgia, an attempt was made to estimate the proportion of breeding females in samples obtained during a mark-recapture experiment. These were identified by measurements of the cloaca, which greatly enlarges at egg-laying. A concurrent experiment with individually marked birds determined that breeding females could be discriminated from males and non-breeders for c 30 days after laying. The technique is probably applicable to other petrels, though it will work best with those that lay most synchronously. The overall population estimate was 4841-5515 birds (SE 856-1417); estimates of breeding females gave a population of 2300 pairs early in the incubation period and 1400 pairs near hatching. (Auth.)

B-37125

McMeekin, T.A., Franzmann, P.D., **Effect of temperature on the growth rates of halotolerant and halophilic bacteria isolated from antarctic saline lakes,** *Polar biology,* 1988 8(4), p.281-285, 18 refs.

The effect of temperature on the growth rates of *Halomonas subglaciescola* and a *Halobacterium* sp., halotolerant and halophilic bacteria isolated from antarctic saline lakes, was predicted accurately by models which propose a linear relationship between temperature and the square root of the reciprocal of the growth rate. The cardinal temperatures of the strains examined were in general 5-10 C lower than those of taxonomic counterparts isolated from temperate and tropical environments. Temperature dependence data for strains of the *Halobacterium* sp. and annual temperature profiles of Deep Lake allowed estimation of the *in situ* potential for growth. (Auth.)

B-37126

Wägele, J.-W., **Aspects of the life-cycle of the antarctic fish parasite *Gnathia calva* Vanhöffen (Crustacea: Isopoda),** *Polar biology,* 1988 8(4), p.287-291, 16 refs.

The life-cycle of the antarctic fish parasite *Gnathia calva* Vanhöffen, 1914 (Crustacea, Isopoda) is described. Three larval instars (pranizae) were discerned. Each instar sucks blood from benthic fishes once and then rests hidden for a period of up to 2 years. Pranizae, that have fed, have swollen pereonites, they bear symbiotic bacteria in a rectal vesicle. The third instar is frequently found within small hexactinellid sponges, where they moult and metamorphose into mature specimens. Within the sponges usually a single male is found together with several females and immature adults. On occasions, a premale mounts into a second male and an intraspecific fight eliminates one of the males. Adult stages do not feed. (Auth.)

B-37127

Kottmeier, S.T., Sullivan, C.W., **Sea ice microbial communities (SIMCO). 9. Effects of temperature and salinity on rates of metabolism and growth of autotrophs and heterotrophs,** *Polar biology,* 1988 8(4), p.293-304, Refs. p.302-304.

Sea ice microbial communities (SIMCO) grow luxuriantly within several microhabitats of sea ice, indicating that the microorganisms comprising these communities are well adapted to the physicochemical gradients which characterize sea ice. SIMCO, obtained from the bottom of congelation ice in McMurdo Sound, were used to test the hypothesis that low temperature limits microbial productivity in polar oceans and also to investigate the effect of salinity on rates of autotrophic and heterotrophic metabolism. Substantial rates of carbon fixation, incorporation of thymidine, and uptake of glutamate occurred at the *in situ* temperatures of -1.9 C, with maximum rates at temperatures considerably warmer but below 15 C. Microalgae and bacteria of SIMCO are thus indicated to be psychrophiles. Data suggest that a recent hypothesis proposing the uncoupling of primary production and bacterial production in cold water, due to differential growth of phytoplankton and bacterioplankton at low temperatures, is refuted with respect to SIMCO. Maximum rates of carbon fixation by autotrophs of SIMCO occurred at salinities which characterized the ice from which the SIMCO were collected. In contrast, heterotrophs of SIMCO exhibited a more stenohaline response to variable salinity. (Auth. mod.)

B-37128
McCann, T.S., Rothery, P., **Population size and status of the southern elephant seal *(Mirounga leonina)* at South Georgia, 1951-1985,** *Polar biology,* 1988 8(4), p.305-309, 24 refs.

The elephant seal population of South Georgia was surveyed comprehensively during the 1985 breeding season. 87,711 females and 10,260 adult males were counted. The counts were corrected using a model of the haul-out distribution to adjust for date of count. Annual pup production was estimated to be about 102,000. Counts made at various beaches on South Georgia between 1951 and 1964 were examined to compare pup production then with present data. Although the population has fluctuated substantially, the 1985 population estimate was very similar to the estimate based on an incomplete survey in 1951. This contrasts with the Indian Ocean and Macquarie I. populations of this species which recent surveys show to be declining. (Auth.)

B-37129
Ellis-Evans, J.C., Sanders, M.W., **Observations on microbial activity in a seasonally anoxic, nutrient-enriched maritime antarctic lake,** *Polar biology,* 1988 8(4), p.311-318, 27 refs.

Amos Lake is a shallow, permanently cold, maritime antarctic lake which is almost totally anoxic for much of the 9 month period of winter ice cover each year. The lake catchment is a source of considerable nutrient enrichment for the lake due to the presence, in summer, of large numbers of seals and seabirds. A dense growth of phytoplankton was supported by this enrichment and, in turn, was a source of nutrients for the diverse microflora of the lake. The phytoplankton had a very high assimilation efficiency and an apparent high tolerance of anoxia. Bacterioplankton numbers and activity were closely linked to algal activity and both groups showed a strong seasonality typical of polar systems. Anaerobic bacteria (notably sulphate reducers and methanogens) were not as significant as anticipated, being largely restricted to the deeper lake trough region and possibly subject to substrate limitation later in the anoxic period. The results are discussed in the context of previous findings for other maritime antarctic lakes. (Auth.)

B-37133
Medina, F.A., **Albian Megatrigoniinae from Lake Cardiel, Santa Cruz province, and *Trigonia hyriiformis* Wilckens from antarctic Cretaceous (Bivalvia)** [Megatrigoniinae del Albiano del Lago Cardiel, Provincia de Santa Cruz, y *Trigonia hyriiformis* Wilckens del Cretácico antártico (Bivalvia)], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.356, 20p., In Spanish with English, French and German summaries. Refs. p.13-15.

The Albian Megatrigoniinae of Lake Cardiel are revised taxonomically, based on a reexamination of all available specimens. *Trigonia hyriiformis* Wilckens from Seymour I. is redescribed and referred to the genus *Goniomya.* (Auth. mod.)

B-37135
Kuczynski, D., **Rotifers of the genus *Brachionus,* new for Antarctica** [Rotíferos del género *Brachionus* nuevos para la Antártida], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.360, 10p., In Spanish with English summary. 14 refs.

The presence of *Brachionus havanaensis* 'var. *trahea*' (Murray) and *B. bidentatus bidentatus* Anderson, on King George I, and *B. bidentatus* 'f. *inermis*' (Rousselet) on Barry I, is reported, with descriptions, figures and comments. These species are new for Antarctica. The genus *Brachionus* is recorded for the first time for the antarctic and subantarctic areas. (Auth. mod.)

B-37137
Croxall, J.P., Davis, R.W., O'Connell, M.J., **Diving patterns in relation to diet of Gentoo and Macaroni penguins at South Georgia,** *Condor,* Feb. 1988 90(1), p.157-167, 35 refs.

The depths attained on 1,444 dives by 14 Gentoo penguins and 6,352 dives by 8 Macaroni penguins were recorded, together with the timing and duration of the foraging trip and the amount and type of prey caught. Macaroni penguins ate only antarctic krill. When feeding only at night they made no dives deeper than 20 m; on all-day trips 36% of dives were between 20 and 80 m. Gentoo penguins fed during the day. When they caught krill, 77% of dives were shallower than 54 m; when fish were taken, 59% of dives were 54 to 136 m, which is consistent with the benthic-demersal habit of the juvenile *Notothenia* and *Champsocephalus* fish they eat. The pattern of predation on krill by both penguin species is consistent with its vertical migration to the surface at night and dispersal through the water column during the day. The food requirements of chick-rearing Macaroni penguins would be met by catching at least 6 adult krill per dive (or 150 juvenile krill or amphipods). For similar Gentoo penguins, a minimum of 15 adult krill per dive (one every 8 sec), or one fish every third dive, is needed. Recorded interannual variations in krill size can treble these rates, which would also be doubled if half the dives were for travelling, not feeding. (Auth.)

B-37138
Weimerskirch, H., Bartle, J.A., Jouventin, P., Stahl, J.C., **Foraging ranges and partitioning of feeding zones in three species of southern albatrosses,** *Condor,* Feb. 1988 90(1), p.214-219, 23 refs.

Foraging ranges and zones of breeding black-browed, gray-headed, and wandering albatrosses were studied in the southwest Indian Ocean, using individuals color-marked at the Kerguelen Is. Black-browed albatrosses forage mainly over the surrounding continental shelf and had a maximum foraging range of 470 km; gray-headed and wandering albatrosses foraged over pelagic waters up to 1,850 km and 1,420 km respectively from their nest. Black-browed albatrosses breeding at two Kerguelen colonies appeared to have essentially separate foraging zones but overlap occurred in an area where trawlers provided an additional food source. The findings support the hypothesis that separation of feeding zones is an extensive means of resource partitioning in albatross communities and populations. (Auth.)

B-37139
Todd, F.S., **Weddell seal preys on Chinstrap penguin,** *Condor,* Feb. 1988 90(1), p.249-250.

An account is given of unusual predatory behavior by a Weddell seal against a Chinstrap penguin. The event occurred in a small open pool near Nelson I. in Dec. 1986 during a period of late season heavy ice and snow cover. The conditions of the attack are described: the extent of the ice and snow, other penguins, seals, and gulls nearby, and normal predation patterns.

B-37140
Cherel, Y., Le Maho, Y., **Changes in body mass and plasma metabolites during short-term fasting in the King penguin,** *Condor,* Feb. 1988 90(1), p.257-258, 10 refs.

The ability of penguins to tolerate prolonged fasting is due to their ability to maintain an effective reduction in body protein utilization (phase II) for a long period. Most of the energy then derives from lipid oxidation. Afterwards protein utilization increases during a shorter phase III. However, as penguins fast prior to their arrival in the colony, only a little information is available on the initial phase (I) of fasting. The present study is believed to provide the first data on changes in rate of loss in body mass and plasma metabolites in King

penguins *Aptenodytes patagonica,* that were initially fed and then fasted. (Auth.)

B-37151

Brood, K., **Nature on Falkland Islands** [Natur pa Falklandsöarna], *Fauna och flora,* Oct. 1987 No.4, p.178-185, In Swedish. 3 refs.

A brief review is given of the history of Falkland Is. and of the geological features linking it to Gondwanaland. Plant and animal life on the islands is described; photographs of seals, penguins and other birds are presented.

B-37153

Bergstrom, D.M., **Atlas of seeds and fruits from Macquarie Island,** *Linnean Society of New South Wales. Proceedings,* Jan.-Aug. 1986 109(1-2), p.69-90, 19 refs.

Seeds and fruits of 30 members of the vascular flora from subantarctic Macquarie I. are described and illustrated. The atlas was constructed to aid in identification of fossils found in peat deposits on the island. (Auth.)

B-37155

Dodge, J.D., Priddle, J., **Species composition and ecology of dinoflagellates from the southern ocean near South Georgia,** *Journal of plankton research,* July 1987 9(4), p.685-697, 30 refs.

Dinoflagellates were identified and counted from preserved vertical net haul samples collected from a station grid centered on South Georgia in austral summer 1981-1982. All species were scarce in comparison with diatoms, the dominant large-celled microplankton. *Dinophysis antarctica* Balech was the most abundant and widespread species. Maximum dinoflagellate numbers were found at stations forming a belt to the south and west of the island. Whilst previous analysis of diatom community composition had revealed distinct species associations, no differences in species composition between this region and areas of low dinoflagellate abundance could be resolved. Since both heterotrophic and photoautotrophic taxa were found in the samples, it is difficult to identify environmental features which could act on most of the dinoflagellate taxa. The large-scale pattern of dinoflagellate distribution may reflect the pattern of water circulation along the edge of the South Georgia continental shelf. (Auth.)

B-37156

Weber, L.H., El-Sayed, S.Z., **Contributions of the net, nano- and picoplankton to the phytoplankton standing crop and primary productivity in the southern ocean,** *Journal of plankton research,* Sep. 1987 9(5), p.973-994, Refs. p.992-994.

The southern ocean phytoplankton community is largely dominated by nanoplankton (cells which will pass a 20-micron mesh), as demonstrated by numerous size-fractionated measurements of both chlorophyll *a* and carbon uptake rates. A significant portion of the photoautotrophs in the antarctic ocean are in the picoplankton (<1-micron) size range. The relative proportions of nano- and picoplankton are highly variable both in space and time. In the vicinity of Elephant I., Drake Passage and the Bransfield Strait, the contribution of nanoplankton to integrated water column chlorophyll *a* was 39-98%. In the western Indian sector of the Antarctic, 31-92% of the chlorophyll was in the nanoplankton size fraction. Picoplankton accounted for 5-74% and 7-42% of the chlorophyll *a* in the Drake Passage/Bransfield Strait region and in the Indian sector respectively. Size-fractionated measurements of carbon uptake in the Indian Ocean sector revealed that nanoplankton accounted for 16-92% and picoplankton for 0-32% of the primary production. (Auth. mod.)

B-37157

Little, G.J., Bryden, M.M., Barnes, A., **Growth from birth to 20 days in the elephant seal, *Mirounga leonina,* at Macquarie Island,** *Australian journal of zoology,* 1987 35(4), p.307-312, 20 refs.

Recent investigations by members of Australian National Antarctic Research Expeditions to Macquarie I. have revealed a decrease in the elephant seal population there of approximately 50% over the last 36 years. Lower birth weights and/or slower growth during the lactation period might explain this decrease. To test this hypothesis, growth of pups was studied from birth to 20 days during the 1984 and 1985 breeding seasons; these results were compared as far as possible with similar results for the 1956 and 1965 seasons. Average birth weight has not changed significantly over the last 20 years. It is concluded that, on the evidence available, the pattern of pup growth on Macquarie I. has not altered significantly with time, but more work is needed to reach a clear conclusion. (Auth. mod.)

B-37158

Wasmer, R.A., **New records for *Physetocaris microphthalma* Chace (Decapoda, Caridea, Physetocarididae) from the South Pacific,** *Crustaceana,* Nov. 1985 49(3), p.315-317, 9 refs.

Between July 1962 and Dec. 1972, as part of the U.S. Antarctic Research Program, the USNS *Eltanin* was involved in a systematic, multidisciplinary survey of the Antarctic, Subantarctic, and adjacent regions of the Pacific and Atlantic oceans south of 30S. Extensive use of a 3-m Isaacs-Kidd midwater trawl formed an integral part of the biological portions of this program. Numerous samples of midwater organisms were collected and subsequently processed by the Smithsonian Oceanographic Sorting Center. Among the pelagic caridean crustaceans collected from the South Pacific were two specimens of *Physetocaris microphthalma* Chace, taken at positions which considerably extend the geographical range of this rare species. (Auth. mod.)

B-37161

Fryxell, G.A., Kendrick, G.A., **Austral spring microalgae across the Weddell Sea ice edge: spatial relationships found along a northward transect during AMERIEZ 83,** *Deep-sea research,* Jan. 1988 35(1A), p.1-20, Refs. p.16-19.

In the northwestern Weddell Sea and eastern Scotia Sea on a transect north from ice-covered, through ice-melt, to open-ocean stations, microalgae were compared to document an enhanced biological activity expected near the ice edge. The highest numbers of cells were found in open water, with 68,700,000,000 cells/sq m north of the ice edge. The dominant taxa under the ice and in the ice-melt stations were the pennate diatom genus *Nitzschia* and the prymnesiophyte *Phaeocystis.* In the open ocean, the dominants were the centric diatom *Thalassiosira gravida* and *Phaeocystis.* Although *Phaeocystis* cells were frequently dominant in number, the genus represented far less carbon than *T. gravida* in open waters; *Phaeocystis* presents a taxonomic and ecological enigma in comparison with accounts from the Northern Hemisphere in that it was abundant where diatoms also flourished. *Nitzschia* survived in low light under the ice and in the brine pockets in the ice and increased steadily in abundance at the ice edge in the open water, whereas *Thalassiosira* was most abundant to the north and west where the water had recently been uncovered by the retreating ice edge. Of the three dominant taxa, *Nitzschia* appears to provide the best food base for the zooplankton such as krill. (Auth. mod.)

B-37162

Daly, K.L., Macaulay, M.C., **Abundance and distribution of krill in the ice edge zone of the Weddell Sea, austral spring 1983,** *Deep-sea research,* Jan. 1988 35(1A), p.21-41, Refs. p.40-41.

The effect of the ice edge zone on the abundance and distribution of krill was investigated by acoustic and net sampling methods in the northwestern Weddell Sea during austral spring, 1983. The dominant acoustic target was *Euphausia superba* which occurred over the entire study area in the upper 100 m of the water column, either in aggregations or loosely defined layers. The vertical depth distribution under the pack ice was similar to that of open water. Average krill biomass under the ice ranged from 1 to 68 g/sq m and in open water range from 10 to 100 g/sq m. Another euphausiid, *Thysanoessa macrura,* appeared to be ubiquitous but was much less abundant than *E. superba. T. macrura* also formed aggregations. All stages were found in open water, but only adults and juveniles under the ice. A few adults and larvae of a third euphausiid, *E. frigida,* were found only in open water. Salps, which were abundant in open water, were not present under the pack ice. The pack ice directly influenced the abundance and distribution of young krill. *E. superba* were much more abundant under the ice than in open water north of the ice edge. (Auth. mod.)

B-37164

Hoberg, E.P., ***Tetrabothrius shinni*** **sp.nov. (Eucestoda) from *Phalacrocorax atriceps bransfieldensis* (Pelecaniformes) in Antarctica with comments on morphological variation, host-parasite biogeography, and evolution,** *Canadian journal of zoology,* Dec. 1987 65(12), p.2969-2975, 35 refs.

Tetrabothrius shinni n.sp. is most similar to *Tetrabothrius phalacrocoracis* Burt, 1977, the only other tetrabothriid known from the Phalacrocoracidae. Specimens of *T. shinni* are distinguished by a relatively small scolex, numerous testes, a large genital atrium, a long male canal with a prominent distal sphincter, and the configuration of the genital atrium. The extreme intraspecific variation in some morphological characters evident in specimens of *T. shinni* suggests that a reevaluation of some *Tetrabothrius* spp. is required. The life cycle of *T. shinni* is thought to involve nototheniid fishes as second intermediate or paratenic hosts. The host and geographic distributions and a suite of unique characters shared by *T. shinni* and *T. phalacrocoracis* suggest that they are sister species in which cladogenesis during the Tertiary coincided with that of shags referred to the subgenera *Leucocarbo* and *Stictocarbo.* (Auth. mod.)

B-37165

Testa, J.W., **Juvenile survival and recruitment in a population of Weddell seals *(Leptonychotes weddellii)* in McMurdo Sound, Antarctica,** *Canadian journal of zoology,* Dec. 1987 65(12), p.2993-2997, Refs. p.2996-2997.

Survival and recruitment of Weddell seal pups were studied in eastern McMurdo Sound. Pups were marked and their apparent survival estimated by mark-recapture methods. The resulting estimates were used together with published estimates of adult survival, yearly sighting probabilities, and direct counts of pup production to simulate the dynamics of the population and evaluate the assumption that it is closed to immigration. Estimates derived from census data in 1982 and 1983 were over 5 times larger than those simulated. This discrepancy was due to the extremely low juvenile survival rates calculated from marked seals. Since few animals born in Erebus Bay return to breed, the large adult breeding population must be the result of substantial immigration, indicating an important role for juvenile dispersal in the population dynamics of Weddell seals. (Auth. mod.)

B-37170

Czarnecki, B., Bialasiewicz, D., **Fungi as a component of the aerosphere in the H. Arctowski polar station and its vicinity (King George Island, South Shetland Islands),** *Polish polar research,* 1987 8(2), p.153-158, 16 refs.

Mycological analyses of the air and food remnants in heated and non-heated rooms at Arctowski Station were carried out. In the material, 23 fungi strains were found representing 10 species of the classes Ascomycetes, Zygomycetes and Deuteromycetes. (Auth.)

B-37171

Kolakowski, E., **Seasonal changes in nitrogen fractions in the antarctic krill *(Euphausia superba* Dana). Pt 1. Basic nitrogen fractions,** *Polish polar research,* 1987 8(2), p.159-166, 7 refs.

Changes in the amount of basic nitrogen fractions (total, protein and non-protein nitrogen) were studied in an annual cycle. Significant seasonal changes were noted, minima occurring in winter and maxima during the spring-summer season. These changes are due mainly to high fluctuations of water content in krill in the annual cycle. (Auth.)

B-37173

Lukowski, A.B., Karolewski, M.A., Górski, T., **Polychlorinated biphenyls in the tissues of antarctic marine migratory birds and penguins from the breeding colony on King George Island (South Shetland Islands),** *Polish polar research,* 1987 8(2), p.179-187, 17 refs.

Contents of PCBs were investigated, using gas chromatography, in tissues of 4 antarctic migratory birds: *Oceanites oceanicus, Larus dominicanus, Catharacta skua* and *Sterna vittata,* and in 3 penguin species: *Pygoscelis adeliae, P. papua* and *P. antarctica.* Samples were collected at King George I. in Feb. 1978 and, for comparison, in Mar. 1983. The highest PCB content was recorded in the adipose tissue of *O. oceanicus* and *C. skua* (15.7 and 1.2 ppm). Differences in the content of these compounds in the tissue of various penguin species in 1978 was observed; it was higher in 1983 than in 1978. Differences in the level of PCB contents in the tissue of migratory birds were related to their winter migrations to areas polluted to various degrees with PCB residues. (Auth.)

B-37174

Karolewski, M.A., Lukowski, A.B., Halba, R., **Residues of chlorinated hydrocarbons in the adipose tissue of antarctic pinnipeds,** *Polish polar research,* 1987 8(2), p.189-196, 21 refs.

Samples of adipose tissue of 5 pinniped species were collected in 1979-1981 on King George I. and the eontents of chlorinated hydrocarbons (CHs) were determined with the gas chromatography method. The highest values were recorded in the leopard seal (432.3-614.7 ppb DDT); the second highest values, in the mature elephant seal (73.4 ppb DDT); and the third, in the Weddell seal (54.4-69.1 ppb DDT). The highest level of HCH content (23.3-32.1 ppb) was recorded in the Weddell seal. A decrease in the content of pp'DDE in the adipose tissue of crabeater seal in successive years was recorded, the values being 36.8 ppb in 1979, 24.4 ppb in 1980, and 15.3 ppb in 1981, as well as an increase in the concentration of HCH (15.3 ppb in 1980 and 27.4 ppb in 1981). The contents of CHs in the adipose tissue of antarctic pinnipeds are 100-1000 times lower than those in the arctic seals. (Auth.)

B-37181

Hudson, J.A., Daniel, R.M., **Enumeration of thermophilic heterotrophs in geothermally heated soils from Mount Erebus, Ross Island, Antarctica,** *Applied and environmental microbiology,* Feb. 1988 54(2), p.622-624, 12 refs.

Soil samples with temperatures up to 64 C were collected from Mount Erebus, an active volcano located on Ross I. Acridine orange direct counts and most probable number counts of soil samples stored at 4 C for 2 months showed a wide variation in the number of thermophilic microorganisms in different soils. Organisms similar to *Clostridium thermohydrosulfuricum, Bacillus schlegelii,* and *Bacillus*

acidocaldarius, as well as neutrophilic *Bacillus* strains, were isolated. (Auth.)

B-37186

Krushinskaia, N.L., Lisitsyna, T.IU., **Behavior of marine mammals** [Povedenie morskikh mlekopitaiushchikh], Moscow, Nauka, 1983, 336p., In Russian. Refs. p.306-333.

The extensive literature concerning the behavior of Cetacea, Pinnipedia—the elephant, Weddell and crabeater seals among them—and the sea otter *Enhydra lutris* is reviewed. A comparative intra- and interspecies analysis of the reproductive, parental, competitive, cooperative, and mating features, and the ecological influences on them, is presented. The intensity of the maternal instinct in the female seal, manifest in her protective attitude toward her young to ensure a continuation of the species in the inclement polar conditions, is discussed.

B-37194

Savage, G.P., Foulds, M.J., **Chemical composition and nutritive value of antarctic krill *(Euphausia superba)* and the southern blue whiting *(Micromesistius australis)***, *New Zealand journal of marine and freshwater research,* 1987 21(4), p.599-604, 25 refs.

Freeze-dried or oven-dried antarctic krill and southern blue whiting (SBW) were analyzed for their proximate and amino acid contents. Each sample was then combined into semi-purified diets and fed to male weaning rats. The krill and SBW meal provided the sole source of protein in each diet. The true digestibility of the protein of all diets was consistently high (94.0-96.6%). The mean biological value *(BV)* of the SBW meal was 78.7, similar to that of white fish meal (81.0). The krill meal had significantly lower *BV* (mean 65.9), which could be significantly improved on addition of 0.1% DL-methionine *(BV* 75.6) or 0.1% cystine *(BV* 72.9). (Auth.)

B-37195

Ward, B.L., ***Schackoinella antarctica,* a new species of Foraminiferida (Glabratellidae)**, *New Zealand journal of marine and freshwater research,* 1987 21(4), p.621-625, 8 refs.

The new species *Schackoinella antarctica* is described from seafloor sediments in McMurdo Sound and from raised beach samples on Ross I. This species is a rare calcareous form, averaging 0.1 mm in size, and was found in water 80 to 620 m deep in McMurdo Sound. No live specimens have been recovered. Forms belonging to this genus have also been found in India, Western Australia, Austria, and possibly Poland. (Auth.)

B-37198

Furness, R.W., Monaghan, P., **Seabird ecology,** Glasgow, Scotland, 1987, 164p. (pertinent p.83-91), Refs. p.148-159.
DLC QL673.F87 1987

In the book as a whole the authors put a global focus on seabird life styles (mating, breeding, nesting, foraging); feeding ecology (variable feeding methods, species determined); regulating seabird populations; interactions with fisheries (competing consumers); monitoring marine environments (for toxic materials supplied by man); seabirds as pests (in urban environments, fecal material contaminating water supplies, safety hazard to aircraft); and conservation requirements. In the pertinent pages, the emphasis is on the importance of antarctic krill to the birds, whales, and seals in antarctic waters.

B-37200

Pinto Coelho, A., **Biomedical aspects of antarctic research** [Aspectos biomédicos das pesquisas Antárticas], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Sep. 1986 No.9, p.2-8, In Portuguese. 10 refs.

The following antarctic points of interest are discussed: environment, chemical-physiological processes in adaptation to cold, algal and human photoadaptation, blood and circulation in seals, and acclimatization in man.

B-37211

Robin, J.-P., **Protein and lipid utilization during long-term fasting in emperor penguins,** *American journal of physiology,* Jan. 1988 254(1), p.R61-R68, 33 refs.

The body mass of male emperor penguins is about 38 kg at the beginning of the 4-mo winter fast connected with breeding, and it is an estimated 18 kg in leanest birds at the time of spontaneous refeeding. For a 38- to 18-kg range, the changes in the rate of body mass loss, body composition, and plasma concentrations of uric acid and urea were investigated. After the first few days *(phase I)* a steady state *(phase II)* was reached in the proportions of the energy derived from proteins and lipids, with proteins accounting for a constant 4%, and the remaining 96% being from lipids. The same proportions were maintained until body mass had decreased to 24 kg. Below this value the proportion of energy derived from proteins increased progressively *(phase III),* being 14 times higher at 18 kg than during *phase II.* Rate of body mass loss and plasma uric acid and urea concentrations closely reflected the changes in protein utilization. Emperor penguins also fast during the spring, but for periods of only 2-3 wk. A 2.5 times higher value was found for rate of body mass loss, uric acid, and urea during spring *phase II,* suggesting lower effectiveness in protein sparing at the time, which is attributed to the lower initial lipid reserves of spring birds. (Auth.)

B-37213

Cuartas, E.I., **Porifera (Demospongiae) collected on the B/I *Dr. E. Holmberg* cruise** [Poríferos de la Campaña del B/I *Dr. E. Holmberg* (Demospongiae)], *Neotropica,* June 1, 1986 32(87), p.45-48, In Spanish with English summary. 7 refs.

Five species of Porifera, collected from the Falkland Is. and adjacent waters, are described and illustrated. These species are: *Tedania mucosa* Thiele, 1905; *T. massa* Ridley and Dendy, 1886; *T. charcoti* Topsent, 1908; *Pronax clathrata* Lévi, 1963; and *Desmacidon ramosa* Ridley and Dendy, 1886. (Auth. mod.)

B-37220

Gershanovich, D.E., ed, Vsesoiuznyĭ nauchno-issledovatel'skiĭ institut morskogo rybnogo khoziaĭstva i okeanografii, **Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean. Collection of papers** [Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane. Sbornik nauchnykh trudov], Moscow, 1987, 220p., In Russian. Refs. passim. For individual papers see B-37221 through B-37225, B-37227 through B-37229, and E-37226.

This volume contains a collection of papers on Soviet ichthyological and hydrological investigations carried out from 1965, on board the *Akademik Knipovich* and the *Professor Mesiatsev,* with the purpose of establishing a trophic relationship between fish and their environment, biogeography and ichthyoplankton.

B-37221
Bogdanov, A.S., Gershanovich, D.E., Sokolov, V.A., **Main areas of complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean** [Osnovnye raĭony kompleksnykh rybokhoziaĭstvennykh issledovaniĭ VNIRO v Mirovom okeane], Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane (Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean). Edited by D.E. Gershanovich, Moscow, 1987, p.5-19, In Russian with English summary. Refs. p.16-19.

The principles are considered of the organization of complex fishing resource studies in the open ocean carried out in the last 20 years on board the R/V *Akademik Knipovich* and the *Professor Mesiatsev*. Results of studies in the Antarctic, including transoceanic current zones and upwellings in relation to the patterns of fish productivity in the areas surveyed, are presented. (Auth. mod.)

B-37222
Liubimova, T.G., Shust, K.V., **Results of studies of fish resources in the southern ocean** [Itogi izucheniia rybnykh resursov IUzhnogo okeana], Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane (Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean). Edited by D.E. Gershanovich, Moscow, 1987, p.19-43, In Russian with English summary. Refs. p.36-43.

Characteristic features of biology, patterns of distribution and formation of fish concentrations in shelf zones of subantarctic islands, near-continental seas, antarctic islands of western Antarctica, and in the open mesopelagial southwards of the Antarctic Convergence, are considered. The level of fish productivity in the antarctic shelf zones is determined and a preliminary estimation of common lanternfish biomass in the Polar frontal zone waters is presented. The prospects for the effective use of fish resources of the Antarctic with regard to the requirements of ANTCOM are shown. (Auth.)

B-37223
Makarov, R.R., Maslennikov, V.V., Soliankin, E.V., **Study of hydrological peculiarities in relation to the formation of bioproductivity in antarctic waters** [Issledovaniia gidrologicheskikh osobennosteĭ vod Antarktiki v sviazi s problemoĭ formirovaniia ikh bioproduktivnosti], Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane (Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean). Edited by D.E. Gershanovich, Moscow, 1987, p.43-65, In Russian with English summary. Refs. p.59-65.

The peculiarities of hydrological conditions affecting macroplankton distribution, primarily *Euphausia superba* Dana, as well as some features of *E. superba* population structure and recruitment, are considered. The patterns of *E. superba* distribution, in relation to the peculiarities of water circulation of different spatial scale and properties of different modifications, determined by variable climatic conditions, dynamic and glacial regimes of the formation areas, are ascertained. An agreement between relative abundance and biological state of euphausiids, and the patterns of mutual distribution of different modifications of antarctic waters as different biotopes, is established. (Auth. mod.)

B-37224
Arzhanova, N.V., **Conditions of mineral feeding of phytoplankton in antarctic waters** [Usloviia mineral'nogo pitaniia fitoplanktona v vodakh Antarktiki], Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane (Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean). Edited by D.E. Gershanovich, Moscow, 1987, p.65-79, In Russian with English summary. Refs. p.77-79.

Phytoplankton nutrient supply varies considerably in the Atlantic and East Pacific sectors of the antarctic ocean. In the Subantarctic and the northern part of the Antarctic Circumpolar Current waters phytoplankton nutrient supply is the major factor limiting the plankton development, while in the central and southern portions of the Antarctic Circumpolar Current, and in the waters of high latitudinal modifications, nutrients do not limit phytoplankton production. The level and efficiency of the use of nutrients are controlled by the physical factors of the environment in the area studied. (Auth. mod.)

B-37225
Mordasova, N.V., **Chlorophyll studies in the southwestern Atlantic Ocean** [Issledovaniia khlorofila v iugo-zapadnoĭ chasti Atlanticheskogo okeana], Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane (Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean). Edited by D.E. Gershanovich, Moscow, 1987, p.79-95, In Russian with English summary. Refs. p.94-95.

A study of chlorophyll *a* content in the southwestern Atlantic Ocean, using the sounding apparatus *Aquatrac* measuring continuous fluorescence of chlorophyll *a* to the depth of 400 m, was carried out during the cruise of the R/V *Akademik Knipovich* Feb-Mar, 1985. The patterns of chlorophyll distribution in different water types in relation to oceanic and biological factors were established. High inhomogeneity in the distribution, both in open ocean and in near-shelf areas, was recorded. Water gyre and eddy zones off South Georgia, zones with different water type mixing, and gradient zones above seamounts, can be referred to as highly productive zones, with a chlorophyll content of more than 1 mg/l. (Auth. mod.)

B-37227
Permitin, IU.E., **Study of fauna and distribution of antarctic benthic fishes** [K issledovaniiu fauny i rasprostraneniia donnykh ryb Antarktiki], Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane (Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean). Edited by D.E. Gershanovich, Moscow, 1987, p.135-156, In Russian with English summary. Refs. p.152-156. For a similar paper under same title see B-36276.

Studies of species composition, distribution, ecology, and origin of benthic antarctic ichthyofauna are reviewed. New species, genera and families of antarctic fishes were found during the cruises of R/V *Akademik Knipovich*. Of these, 26 species were new to West Antarctica, and 9 species were new to East Antarctica. (Auth. mod.)

B-37228
Efremenko, V.N., **Ichthyoplankton studies in West Antarctica** [Ikhtioplanktonnye issledovaniia v Zapadnoĭ Antarktike], Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane (Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean). Edited by D.E. Gershanovich, Moscow, 1987, p.157-171, In Russian with English summary. Refs. p.168-171.

Based on an analysis of the species composition, egg and larva distribution, the areas, time and pattern of spawning, the types of reproductive ranges of mesopelagic and bottom antarctic fishes were established. All year round, intermittent spawning, occurring in deep warm water masses, is typical of the mesopelagic fishes in which 2 types of reproductive ranges were found. Unlike the mesopelagic fishes, the antarctic bottom fishes are characterized by a simultaneous seasonal spawning in shelf waters, mainly. Three spawning groups; autumn-winter, winter-spring and spring-summer, were distinguished, based on differences in the time of spawning. (Auth. mod.)

B-37229
Kozlov, A.N., Tarverdieva, M.I., **Role of trophic studies in investigations of productivity in common fish species populations** [Rol' trofologicheskikh issledovaniĭ v izuchenii formirovaniia produktivnosti populiatsiĭ massovykh vidov antarkticheskikh ryb], Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane (Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean). Edited by D.E. Gershanovich, Moscow, 1987, p.171-184, In Russian with English summary. Refs. p.181-184.

As a result of long-term studies carried out in the Antarctic by the R/V *Akademik Knipovich* data on fish food habits, seasonal, regional and age feeding patterns of species, were obtained. The peculiarities of fish biology, behavior and distribution in relation to the trophic effect were established. It is found that the biomass of planktonic crustaceans, mainly euphausiids, is of great importance in determining the distribution and production of the common antarctic fish species. (Auth.)

B-37235
Gutt, J., **Distribution and ecology of sea cucumbers (Holothuroidea, Echinodermata) in the Weddell Sea (Antarctica)** [Zur Verbreitung und Ökologie der Seegurken (Holothuroidea, Echinodermata) im Weddellmeer (Antarktis)], *Berichte zur Polarforschung,* 1988 No.41, 87p., In German with English summary. Refs. p.79-86.

The thesis describes species composition and ecology of holothurians in the Weddell Sea. Specimens were obtained from 52 stations along the shelf in the eastern and southern Weddell Sea. The samples were collected during the *Polarstern* cruises ANT I, ANT II and ANT III of 1983, 1984 and 1985 respectively, using an Agassiz trawl, bottom trawl and box dredge. 26,833 specimens, belonging to 34 species, 22 genera, 7 families and 5 orders were collected. Nine species and two genera are newly described. (Auth.)

B-37238
Nichols, P.D., **Occurrence of an isoprenoid C25 diunsaturated alkene and high neutral lipid content in antarctic sea-ice diatom communities,** *Journal of phycology,* Mar. 1988 24(1), p.90-96, 44 refs.

The lipid and hydrocarbon composition of natural populations of diatom communities collected during the austral spring bloom of 1985 in the sea-ice at McMurdo Sound was analyzed. Sea-ice diatom communities were dominated by *Amphiprora* sp., *Nitzschia stellata* Manguin and *Berkeleya* sp. at Cape Armitage; *N. stellata, Amphiprora, Pleurosigma, N. Kerguelensis* (O'Meara) Hasle and some small centric diatoms adjacent to the Erebus Ice Tongue; and *Porosira pseudodenticulata* (Hustedt) Jouse at Wohlschlag Bay. Lipid distributions of the sea-ice diatom communities from the Cape Armitage and Erebus sites were characterized by high concentrations of triacylglycerol. A hydrocarbon common in temperate diatoms, and an isoprenoid C25 diunsaturated alkene were the dominant hydrocarbons detected at these two sites. Hydrogenation of the C25 diene produced the known alkane 2, 6, 10, 14-tetramethyl-7-(3-methylpentyl)-pentadecane. The C25 diene is one of several structurally related hydrocarbons reported in many estuarine, coastal and oceanic sediments. It is proposed that certain species of diatoms are a likely source of these alkenes in sediments. (Auth. mod.)

B-37243
Bustamante A., R., Serey E., I., Guzmán G., G., **Significance of the Coppermine Peninsula in a terrestrial ecology research program** [Importancia de península Coppermine (isla Robert) para el desarollo de un programa de investigación en ecología terrestre], *Boletín Antártico Chileno,* July-Dec. 1987 7(2), p.5-8, In Spanish. 14 refs.

After reviewing the ecology of Coppermine Peninsula, pointing out its wealth in animal and plant species, a research program is proposed and outlined which would answer some questions regarding the antarctic terrestrial ecosystem, and the human factor endangering it, and would permit comparisons with the arctic tundra in terms of common strategies developed by living organisms to survive in an extremely cold environment.

B-37248
Parmelee, D.F., Parmelee, J.M., **Movements of southern Giant Petrels ringed near U.S. Palmer Station, Antarctica,** *Ringing and migration,* Oct. 1987 8(2), p.115-118, 5 refs.

Of the 1,390 Giant Petrels *Macronectes giganteus* nestlings ringed near U.S. Palmer Station, 20 (1.4%) were recovered far from the natal grounds during their first (85%) and second (15%) years. The peak recovery month was July, shortly after the nestlings had fledged in May. Recovery localities were widely separated and included Chile, Brazil, Falklands, South Africa, New Zealand, but with the majority (75%) recovered in the Australian region. Although the results of this study substantiate previous observations of others, several unresolved basic questions remain concerning the movements of pre-breeding and breeding Giant Petrels. Reference is made to a newly initiated study at Palmer Station involving the use of bird-borne satellite transmitters for resolving some of these problems. (Auth.)

B-37251
Hagerhall, B., **Antarctica, an international park** [Antarktis internationalparken], *Sveriges natur,* Oct. 1985 76(5), p.2-11, In Swedish.

This mainly pictorial essay presents a statement advocating the preservation of Antarctica as a park to support the many forms of wildlife which exist on the continent and in its surrounding waters. The fragility of the ecosystem is emphasized and the threats to it are discussed. The photography is wide ranging, extending from the Antarctic Peninsula to the Dry Valleys.

B-37252
El-Sayed, S.Z., Hofmann, E.E., **Drake Passage/Western Scotia Sea,** Nimbus-7 CZCS coastal zone color scanner imagery for selected coastal regions: North America, Europe, South America, Africa, Antarctica. Level 2 photographic product, Greenbelt, NASA Goddard Space Flight Center, [1986], p.95-99, 9 refs.

The CZCS pigment image of the central Drake Passage and western Scotia Sea taken on Jan. 6, 1979, and the corresponding locator map, showing the extensive geographical variability of near-surface distributions of phytoplankton pigments in these icy waters, are presented and interpreted. The general pattern and values of the pigments shown in the image are in agreement with shipboard observations made in this region of the southern ocean.

B-37254

Drozdz, J., **Oocysts of six new *Coccidiomorpha* species from pinnipeds of King George Island (South Shetlands, Antarctic),** *Acta protozoologica,* 1987 26(3), p.263-266, 2 refs.

A coproscopical examination of faeces samples in 5 species of pinnipeds from King George I. revealed the occurrence of oocysts of six new *Coccidiomorpha* species. Specific names are given to three more frequent and numerous species for which a process of sporulation has been observed. The following species were found: *Isospora miroungae* sp. n. in young elephant seals *(Mirounga leonina), Eimeria* sp. 1 in crabeater seal *(Lobodon carcinophagus)* and *Eimeria weddelli* sp. n., *E. arctowskii* sp. n., *Eimeria* sp. 2 and *Eimeria* sp. 3 in Weddell seal *(Leptonychotes weddelli).* In the leopard seal *(Hydrurga leonina)* and the eared seal *(Arctocephalus gazella)* no coccidian parasites have been found. (Auth.)

B-37255

Knight, C.A., Hallett, J., DeVries, A.L., **Solute effects on ice recrystallization: an assessment technique,** *Cryobiology,* Feb. 1988 25(1), p.55-60, 10 refs.

Reliable assessment of the effect of a solute upon ice recrystallization is accomplished with "splat cooling," the impaction of a small solution droplet onto a very cold metal plate. The ice disc has extremely small crystals, and recrystallization can be followed without confusing effects caused by grain nucleation. This method confirms the exceptionally strong recrystallization inhibition effect of antifreeze protein from antarctic fish and shows that grain growth rate is a sensitive function of both grain size and solute concentration. (Auth.)

B-37256

Yamada, K., **Simulation by 2-mercaptoethanol and alcohols of protease in antarctic krill, *Euphausia superba,* at low temperatures,** *Agricultural and biological chemistry,* Dec. 1987 51(12), p.3363-3368, 15 refs.

Homogenate of krill *Euphausia superba* was fractionated with a Sephacryl S-400 column resulting in two protease fractions, A (M.W. 50 K) and B (M.W. 30 K). Both fractions digested preferentially the peptide bond adjacent to arginine, and also digested peptide bonds adjacent to lysine and leucine. Their optimum pH was 9.0 and optimum temperature was 37 C in the absence of 2-mercaptoethanol. In the presence of 4.4% 2-mercaptoethanol, the activity of fraction A was stimulated below 30 C, but inhibited at higher temperatures. This led to the shift of optimum temperature from 37 C to 20 C. Some of alcohols also strongly stimulated the krill protease at 20 C. (Auth.)

B-37257

Barber, D.L., Westermann, J.E.M., ***Haemogregarina georgianae* n. sp., a new haemogregarine parasite from the antarctic teleost *Parachaenichthys georgianus*,** *Systematic parasitology,* Jan. 1988 11(1), p.65-71, 22 refs.

Haemogregarina georgianae n.sp. occurs frequently in the bathydraconid teleost *Parachaenichthys georgianus* from the western antarctic portion of the southern ocean. The haemogregarine and its developmental stages in the vertebrate have been seen in fish caught during the austral summer. Morphological evidence suggests the merozoites from macroschizogony give rise to the microschizont, and that the microschizont merozoites give rise to gametocytes. Comparison of *H. georgianae* with other haemogregarines known from teleosts shows that it has a previously undescribed morphology. (Auth.)

B-37260

Kaiser, M., **Sheathbills—chickens of Antarctica?** [Scheidenschnäbel—"Haushühner" der Antarktis?], *Urania,* 1986 No.12, p.34-38, In German.

A group of biologists from the DDR visited the Soviet Antarctic Expedition station at Bellingshausen between 1983 and 1985, studying the sheathbills of King George Island. A brief account is given of the birds' population, feeding habits, breeding behavior, and relationships with other wildlife, principally elephant seals and penguins.

B-37286

Ohman, M.D., **Energy sources for recruitment of the subantarctic copepod *Neocananus tonsus*,** *Limnology and oceanography,* Nov. 1987 32(6), p.1317-1330, 75 refs.

Neocalanus tonsus Brady was collected in subantarctic waters off southeastern New Zealand to test experimentally the importance of storage lipids and particulate matter as energy sources for recruitment. Reproductive copepods occur in mesopelagic depths (1,000-500 m) in austral winter and in epipelagic depths (150-0 m) in spring. Winter copepods released up to 19 eggs/female/d in filtered seawater; spring copepods required a particulate food source to release eggs. Winter females ingested diatoms at half the rate of spring females. Winter CVs did not ingest diatoms, in contrast to spring and summer CVs. Winter females had 24 times the wax ester content, half the phospholipid, and half the nitrogen content of spring females. In contrast, the two groups did not differ in dry mass or carbon content. Application of a proposed method for estimating reproductive potential, combined with experimental results, suggests that stored lipids are the energy source for recruitment of mesopelagic winter animals but not epipelagic spring animals. (Auth. mod.)

B-37289

Spies, A., **Growth rates of antarctic marine phytoplankton in the Weddell Sea,** *Marine ecology progress series,* Dec. 14, 1987 41(3), p.267-274, Refs. p.273-274.

Natural microplankton from summer surface waters of the Weddell Sea was incubated in 10 l Nalgene flasks at -1 C and irradiance. Ambient nutrient concentrations were high enough to support rapid biomass accumulation. Maximum growth rates and generation times of the dominant diatom assemblages were determined by successive cell counts. Growth rates ranged from 0.38 to 1.33 divisions and generation times varied from 18.0 to 63.2 h/division. Thus, rapid growth at low temperatures is possible; growth rates of Weddell Sea phytoplankton are comparable to those of temperate latitudes. (Auth.)

B-37291

Wright, S.W., **Phytoplankton pigment data: Prydz Bay region—SIBEX II, MV *Nella Dan,* January 1985,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Jan. 1987 No.58, 102p., 15 refs.

Phytoplankton samples were collected at hydrographic stations along seven north-south transects during the SIBEX II cruise (Dec. 1984-Feb. 1985). Phytoplankton pigments were analyzed using a high resolution high performance liquid chromatography technique which resolves virtually all known marker pigments. Data are presented for the abundance of twenty-seven pigments in the upper 200 m of the water column at each station. For each major marker pigment, north-south vertical sections are presented, as well as the geographic distribution of each pigment integrated from the surface to 100 m depth and the integrated ratio of that pigment to chlorophyll

a. These represent the total abundance of the algal source and its relative proportion in the population, respectively. (Auth.)

B-37292

Martin, J.M., Fitzwater, S.E., **Iron deficiency limits phytoplankton growth in the north-east Pacific subarctic,** *Nature,* Jan. 28, 1988 331(6154), p.341-343, 26 refs.

An interesting oceanographic problem concerns the excess major plant nutrients (PO4, NO3, SiO3) occurring in offshore surface waters of the Antarctic and northeast Pacific subarctic oceans. In a previous study, indirect evidence was presented suggesting that inadequate Fe input was responsible for this limitation of growth; recently direct evidence for this hypothesis was sought in the northeast Pacific Subarctic. Reported here is that the addition of nmol amounts of dissolved iron resulted in the nearly complete utilization of excess NO3, whereas in the controls—without added Fe—only 25% of the available NO3 was used. It was also observed that the amounts of chlorophyll in the phytoplankton increased in proportion to the Fe added. It is concluded that Fe deficiency is limiting phytoplankton growth in these major-nutrient-rich waters. Belief is expressed that a similarity of chemical content exists between the waters of the Gulf of Alaska and those of the southern ocean. Reasons are presented to support the belief. (Auth. mod.)

B-37295

Delarue, D., **Vascular flora and vegetation of Ile de Croy, Iles Kerguelen,** *Polar record,* Apr. 1988 24(149), p.111-118, 19 refs.

In a botanical field survey of Ile de Croy, Iles Kerguelen, from Nov. 17 to Dec. 14, 1984, 14 of the 29 species of vascular plants known from the archipelago were recorded. None of the eight Kerguelen species of pteridophytes and no introduced species were present. Four major natural plant associations were identified. Notes are given on the habitat, distribution and ecology of each species, and comparisons are made with mainland Kerguelen and neighboring subantarctic islands. The significance for conservation of this relatively undisturbed island is discussed. (Auth.)

B-37298

International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984, Croxall, J.P., ed, Gentry, R.L., ed, **Status, biology, and ecology of fur seals,** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, 212p., PB88-115423, Refs. passim. For selected papers see B-37299 through B-37307.

This volume includes reviews of species biology and ecology that were especially commissioned for the workshop, as well as contributed papers dealing with various aspects of recent research on fur seals. Nine of the papers are pertinent to Antarctica and the subantarctic islands.

B-37299

McCann, T.S., Doidge, D.W., **Antarctic fur seal *Arctocephalus gazella,*** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984. Proceedings. Edited by J.P. Croxall and R.L. Gentry, p.5-8, PB88-115423, 21 refs.

The fur seals of South Georgia are reviewed, including the history of their discovery and exploitation, their distribution, population size and trends, feeding habits (mostly krill), competitors (mostly whales), predation, survivorship, reproductive parameters, ecology, growth, and the current research on *A. gazella* at South Georgia.

B-37300

Bester, M.N., **Subantarctic fur seal *Arctocephalus tropicalis,* at Gough Island (Tristan da Cunha group),** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984. Proceedings. Edited by J.P. Croxall and R.L. Gentry, p.57-60, PB88-115423, 10 refs.

The fur seals of Gough I. are reviewed, including the history of their discovery and exploitation, their distribution, population size and trends, feeding habits, competitors, predation, survivorship, reproductive parameters, ecology, and growth.

B-37301

Kerley, G.I.H., ***Arctocephalus tropicalis* on the Prince Edward Islands,** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984. Proceedings. Edited by J.P. Croxall and R.L. Gentry, p.61-64, PB88-115423, 18 refs.

The fur seals of Prince Edward Is. are reviewed, including the history of their discovery and exploitation, their distribution, population size and trends, influences on population size and trends, reproductive parameters, ecology, growth, and diet.

B-37302

Roux, J.P., **Subantarctic fur seal *Arctocephalus tropicalis* in French subantarctic territories,** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984. Proceedings. Edited by J.P. Croxall and R.L. Gentry, p.79-81, PB88-115423, 33 refs.

The fur seals of Crozet Is. are reviewed, including the history of their discovery and exploitation, their distribution, population size and trends, survivorship, reproductive parameters, ecology, growth, and diet.

B-37303

Roux, J.P., Jouventin, P., **Behavioral cues to individual recognition in the subantarctic fur seal *Arctocephalus tropicalis,*** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984. Proceedings. Edited by J.P. Croxall and R.L. Gentry, p.95-102, PB88-115423, 20 refs.

During the breeding season, individual recognition was studied in different age groups and sex classes of the subantarctic fur seal *Arctocephalus tropicalis* on Amsterdam I. Of all the possible cues, vocal signals are the most important. Detailed analyses of the behavioral sequences, together with playback experiments in the field, show that individual recognition occurs between the females and their pups and also between the territorial males. The biological significance of this is discussed. (Auth.)

B-37304

Doidge, D.W., **Rearing of twin offspring to weaning in antarctic fur seals *Arctocephalus gazella*,** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984. Proceedings. Edited by J.P. Croxall and R.L. Gentry, p.107-111, PB88-115423, 10 refs.

Growth rates of two sets of twin antarctic fur seal pups, *Arctocephalus gazella,* (male-female, female-female) and feeding attendance patterns of their mothers were compared with those of single offspring. The female-female twins had growth rates and weaning weights within the range of single female pups. The male of the female-male pair spent more time suckling and had a signficantly higher growth rate than his sister. Growth in both pups was substantially reduced compared with single pups. Feeding attendance patterns of both mothers was not significantly different from those rearing single offspring although the energy costs of pup rearing increased by 75%. Measures of feeding or attendance duration should be used with caution as potential indicators of prey abundance or energy flow to offspring. Strategies for sexual selection and factors acting against increased litter size in fur seals are discussed. (Auth.)

B-37305

Kerley, G.I.H., Robinson, T.J., **Skull morphometrics of male antarctic and subantarctic fur seals *Arctocephalus gazella* and *A. tropicalis*, and their interspecific hybrids,** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984. Proceedings. Edited by J.P. Croxall and R.L. Gentry, p.121-131, PB88-115423, 19 refs.

The skull morphology of a sample of adult male subantarctic fur seals, *Arctocephalus tropicalis,* from Marion I., antarctic fur seals, *A. gazella,* from Marion I. and South Georgia, and interspecific hybrids from Marion I. was compared. Individual variation was found to be high, and 19 variables were included in the statistical analyses. Phenograms were generated based on both the distance and correlation matrices and showed good separation between the two species. In the principal component analyses, the first component (size) accounted for 81.36% of the variation, while the second component (shape) contributed a further 3.52% of the variation. The two species separated well on the two-dimensional projection of the first two components, with the putative hybrids plotting between the two species clusters. Species integrity was tested using an *a priori* discriminant function analysis which confirmed all classifications as correct. (Auth.)

B-37306

Shaughnessy, P.D., Fletcher, L., **Fur seals *Arctocephalus* ssp. at Macquarie Island,** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984. Proceedings. Edited by J.P. Croxall and R.L. Gentry, p.177-188, PB88-115423, Refs. p.187-88.

Two groups of fur seals at Macquarie I. are recognized: one comprises New Zealand fur seals *Arctocephalus forsteri;* the other includes subantarctic *A. tropicalis* and antarctic fur seals, *A. gazella.* Of these species, it is deduced that *A. tropicalis* is most likely to have been the upland seal. *A. forsteri* has been at the island since at least 1948. It is present year-round, does not breed there, and is the more abundant group. Numbers increase slowly from Nov. to Mar. Annual censuses in about Mar. increased since 1950, reaching 1,222 for the whole island in 1982. Data are provided on pupping season; mortality, nursing period, mass, and growth of pups; and the attendance patterns of cows ashore. For seals of both groups information is provided on spatial and temporal distribution and feeding habits. (Auth. mod.)

B-37307

Roux, J.P., **Recolonization processes in the subantarctic fur seal *Arctocephalus tropicalis* on Amsterdam Island,** *U.S. National Oceanic and Atmospheric Administration. Technical report,* June 1987 NMFS-51, International Symposium and Workshop on the Status, Biology, and Ecology of Fur Seals, Cambridge, Apr. 23-27, 1984. Proceedings. Edited by J.P. Croxall and R.L. Gentry, p.189-194, PB88-115423, 24 refs.

Uncontrolled sealing during the 18th and 19th centuries brought the Amsterdam I. population of *Arctocephalus tropicalis* to the brink of extinction. The numerical and geographical recovery has been studied since 1956. Changes in the rate of increase and in the extension of the breeding sites demonstrate the processes of recolonization of the island. Successive phases are described and compared with other *Arctocephalus* population recoveries. (Auth.)

B-37334

Wilson, G.J., comp, **Distribution and abundance of antarctic and subantarctic penguins: a synthesis of current knowledge,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* July 1983 No.4, 46p., 100 refs.

This report presents a summary of what is known about the distribution and abundance of the 8 species of penguin breeding in Antarctica and on the cooler subantarctic islands. These are: emperor, king, Adélie, chinstrap, gentoo, macaroni, royal and rockhopper penguins. Not included in this report are other penguins whose more northerly distributions overlap with the above species. For each species, there is a brief introduction, a list of the breeding localities, and a series of distribution maps. Wherever possible, this information is tabulated. Breeding localities are grouped into geographical areas that correspond with major discontinuities in penguin distribution. An estimate of the total population (number of breeding pairs) is given for each species. These totals have been taken directly from the counts reported in this paper, and do not include colonies for which no estimate of numbers was available.

B-37335

Kock, K.H., Duhamel, G., Hureau, J.C., **Biology and status of exploited antarctic fish stocks: a review,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* Aug. 1985 No.6, 143p., Refs. p.83-93.

The biology and present status of exploited antarctic fish stocks are reviewed on the basis of data available from 148 scientific publications. The development of antarctic fisheries is depicted in brief. The fisheries are mainly located in the Indian and Atlantic Ocean sectors. To date, catches of 19 species have been recorded in FAO statistics. Apart from the Southern blue whiting and the Rajidae, all species belong to the subantarctic and antarctic endemic families Nototheniidae ('Antarctic cod') and Channichthyidae ('Icefish'). A short description of the life cycle of 18 of these species is given. Available data on length and age at sexual maturity, natural mortality, age and growth, as well as those relevant to population dynamics and stock assessment, are summarized. From the available data, it is suggested that the stocks are not capable of sustaining the catches taken during the peak years. The results indicate that a fishing mortality slightly larger than the estimated natural mortality, would be the most appropriate level for the exploitation of most antarctic fish stocks.

By-catches of juvenile fish during krill fishing is considered to have a detrimental effect on fish recruitment. Recommendations are made dealing with the collection and handling of data to enable the best possible scientific advice to be given on fisheries management. (Auth. mod.)

B-37337

Gon, O., **Description of the postlarva of *Cygnodraco mawsoni* Waite, 1916 (Pisces, Bathydraconidae), from the southern ocean,** *South African journal of zoology,* Oct. 1987 22(4), p.321-322, 4 refs.

Eight postlarvae of *Cygnodraco mawsoni* Waite, 1916, were collected off the Australian Antarctic Mawson Station in the South Indian Ocean, during the South African SIBEX II expedition. These postlarvae are distinctive by having a long and slender body, projecting lower jaw and bicolored caudal fin. Their morphology and pigmentation are unlike any known bathydraconid early life history stages. (Auth.)

B-37340

Bouvy, M., Delille, D., **Numerical taxonomy of bacterial communities associated with a subantarctic mussel bed,** *Helgoländer Meeresuntersuchungen,* 1987 41(4), p.415-424, Refs. p.422-424.

In Jan. 1986, seawater, and bivalves from a mussel bed at Kerguelen Is., were collected and investigated by morphological and biochemical tests to determine whether a specific heterotrophic bacterial community could be observed in the mussels, especially in the stomach and in the fecal pellets, and to compare these micofloras to seawater bacterial communities. Almost all the heterotrophic mesophile isolates, grown on Zobell medium, were non-fermentative Gram-negative rods. The bacterial communities in the mussel fecal pellets were clearly different from the other communities studied. This specific bacterial microflora was characterized by the existence of Vibrionaceae. (Auth. mod.)

B-37341

Delille, D., Bouvy, M., Cahet, G., **Short-term variations of bacterioplankton in antarctic zone: Terre Adélie area,** *Microbial ecology,* 1988 15(3), p.293-309, Refs. p.307-309.

In a scheduled survey, conducted from Jan. to Feb. 1986 in a coastal area of Adélie Coast, seawater samples were collected in a selected station every day, or every hour, during a 17 hour period. Bacterial communities in each sample were studied by measuring direct and viable counts, frequency of dividing cells estimation, taxonomic analysis, and heterotrophic potential. Complementary studies used batch cultures with artificial nutrient supplements. The results clearly suggest a strong potential activity of the natural antarctic bacterial microflora. (Auth. mod.)

B-37342

Reichardt, W., **Impact of the antarctic benthic fauna on the enrichment of biopolymer degrading psychrophilic bacteria,** *Microbial ecology,* 1988 15(3), p.311-321, Refs. p.319-321.

Stenothermic cold adaptation was a predominant growth characteristic among biopolymer degrading bacteria from antarctic shelf sediments. Psychrophilic decomposers of protein (gelatin), chitin, and cellulose accounted for up to 84, 93, and 68%, respectively, of 0 C-isolates from selected compartments of the sediments. Macroinvertebrates were recognized as a selective pressure on these fast-growing (zymogenous) psychrophiles. Psychrophilic properties of growth and biopolymer degradation coincided most in the case of proteolytic isolates. It is suggested that enhanced rates of enzyme synthesis at low temperatures play a crucial role for the degradation of detrital organic matter in this permanently cold environment. (Auth. mod.)

B-37343

Brood, K., **Speaking of South Georgia** [Tema Sydgeorgien], *Fauna och flora,* Feb. 1987 82(1), 49p., In Swedish. Refs. passim.

The issue consists of 15 short articles dealing with various aspects of South Georgia, including the geological features linking it to Gondwanaland; the biology of the seas surrounding it, describing krill as the center of antarctic food chain; the plant and animal life on the island, from seals to birds to insects; and many colorful photographs taken during various Swedish expeditions to the Antarctic.

B-37346

Butterworth, D.S., Miller, D.G.M., **Note on relating antarctic krill catch-per-unit-effort measures to abundance trends,** *South African journal of antarctic research,* 1987 17(2), p.112-116, With Afrikaans summary. 13 refs.

A crude mathematical framework is developed to describe krill abundance in terms of selected parameters of various aggregation behaviors exhibited by antarctic krill. The relationship of combinations of these parameters to various possible measures of catch-per-unit-effort (CPUE) for the antarctic krill fishery is considered. The combined index of catch-per-hour (CPH) of trawling multiplied by the inverse of the average interconcentration search time (IST) is suggested as a possible measure of krill abundance; such an index should be stratified both spatially and by krill aggregation type; this has implications for routine data collection. Models should be constructed to investigate how substantial the non-linearities in the relationship between the index and krill abundance might be. (Auth.)

B-37349

Watkins, B.P., **Population sizes of king, rockhopper and macaroni penguins and wandering albatrosses at Prince Edward Islands and Gough Island, 1951-1986,** *South African journal of antarctic research,* 1987 17(2), p.155-162, With Afrikaans summary. 50 refs.

An international survey of antarctic seabirds was recommended by SCAR to monitor population changes in selected species. Fluctuations in these populations might aid in detecting any changes in relative abundance of prey resources, chiefly krill. Insufficient data exist from the Prince Edward Islands, southern Indian Ocean, to comment on population changes in the king penguin and rockhopper penguin, but macaroni penguins may have increased in numbers at Marion Island since 1977. The rockhopper penguin population at Gough Island may have increased in size. The wandering albatross may have decreased in numbers at Marion Island over the last 12 years. Existing data on the wandering albatross populations of Prince Edward and Gough islands preclude any comment on population trends. Standard techniques in monitoring different species should be employed and it is important to continue monitoring the wandering albatross which is decreasing in numbers at several localities throughout its range. (Auth.)

B-37350

Ryan, P.G., **Distribution, population size, and foraging behaviour of Kerguelen terns at the Prince Edward Islands,** *South African journal of antarctic research,* 1987 17(2), p.163-166, With Afrikaans summary. 14 refs.

A census of Kerguelen terns at Marion and Prince Edward Islands was conducted during Aug. and Sep. 1984. The population size was estimated at 25-30 breeding pairs, of which 20 pairs were on Prince Edward Island. Kerguelen terns were found mostly on the sheltered southeast coast of Prince Edward Island, whereas on Marion Island they were found only on the exposed west and north coasts. The absence of Kerguelen terns from apparently suitable habitat on Marion Island, coupled with the small number of first-year and immature birds counted, suggests that the population at Marion Island may be decreasing. Foraging occurred primarily by dipping, with occasional

surface plunge dives. Most foraging occurred at sea, either over beds of *Macrocystis* kelp or over the surf zone. (Auth.)

B-37355

Smith, H.G., Wilkinson, D.M., **Biogeography of testate rhizopods in the southern temperate and antarctic zones,** *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.83-96, Refs. p.94-96.

A biogeographical analysis is presented of the distribution of 38 species of the testate rhizopod genus *Nebela* Leidy at 14 locations south of 40S. The distribution of 18 species was found to be restricted to the Gondwanaland continents or Southern Hemisphere islands, and 14 species or varieties may be endemic to single locations. Species richness per location shows a clear trend of pauperization with increasing latitude, and also shows a positive correlation with climate as characterized by mean Jan. temperature, indicating that local environment is an important factor determining the distribution of species. However, deviations from the regression of species richness on Jan. temperature, together with the observed degree of endemism, suggest that biogeographical factors are also involved. A phylogenetic model is presented which postulates the evolution of Gondwanaland-specific species during the Jurassic era and of southern endemic species at later dates. (Auth. mod.)

B-37356

Block, W., **Ecophysiology of terrestrial arthropods,** *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.99-106, 32 refs.

This communication reviews information on the ecophysiological adaptations of selected antarctic species to the environmental constraints, particularly of temperature and moisture. The evidence is discussed in two categories: that for metabolism and energetics, and, that on resistance adaptations. The data are mainly for 2 species of micro-arthropods, but comparative information on other species is included. Locomotion, feeding and energetics together with respiratory metabolism and supercooling studies are considered from the viewpoint of summer (non-lethal conditions) and winter (potentially lethal conditions). The ecological consequences of such adaptations are discussed in relation to their evolution in the antarctic fauna. (Auth.)

B-37357

Sömme, L., Block, W., **Ecophysiology of intertidal mites at South Georgia,** *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.107-109, 5 refs.

From experiments carried out on 2 species of intertidal mites from rocky shores of South Georgia, *Halozetes marinus* (Lohmann) and *Hyadesia maxima,* it is concluded that both species are well adapted to life in the littoral zone under climatic conditions of the area. This includes heat tolerance during the summer and cold hardiness during the winter. Their degree of resistance to desiccation indicates that the mites are able to survive when the rocks are warmed by radiative heating; deprivation of oxygen for shorter periods seems to cause no stress. While the rate of inoculative freezing is low in contact with sea water ice, a potentially lethal situation exists with fresh water ice, which induces freezing. These experiments were performed during a summer visit to South Georgia. (Auth. mod.)

B-37358

Travé, J., **Littoral mites from the Kerguelen Islands: some adaptive strategy aspects** [Contribution à la connaissance des Acariens littoraux de l'Archipel de Kerguelen: Quelques aspects des stratégies adaptatives], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.111-127, In French with English summary. 22 refs.

The crustose lichen zone *(Verrucaria* sps.) of the littoral rocky shore of Kerguelen Is. is colonized by 3 species of mites: a Podacarid Oribatid, *Halozetes intermedius* Wallwork, an Hyadesid Acaridid, *Hyadesia kerguelensis* (Lohmann), and an Halacarid Actinedid, *Isobractus magnus* (Lohmann), which present very high densities and feed chiefly on the lichen thallus. This work reports some results of an experimental study, for the 3 species, on their morphological adaptation, ethological and biological adaptation, and degree of resistance to submergence in water and to desiccation. (Auth. mod.)

B-37359

Chauvin, G., Vannier, G., Vernon, P., **Egg of *Anatalanta aptera* Eaton (Diptera: Sphaeroceridae), morphology and resistance to desiccation** [L'oeuf d'*Anatalanta aptera* Eaton (Diptera: Sphaeroceridae), morphologie et résistance à la déssiccation], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.129-136, In French with English summary. 14 refs.

The egg *Anatalanta aptera* Eaton is oblong, with a plane upper side and a convex lower side. The whole egg surface is covered with a porous, polygonal structure. A regular ridge of respiratory horns runs between the upper and the lower part of the egg. The micropyle is located at the anterior pole and the posterior pole bears large holes. The external mucous layer seems to be thin. At +10 C and 0% R.H., the egg is completely dehydrated after 17 hours. The transpiration rate seems to be independent of the water content of the egg. When temperatures are higher than +11 C, the permeability to water becomes very important. The curves of transpiration rate are not the same for increasing or decreasing air temperature. For 2 thermal cycles running from +5 C to +15 C, eggs give dissociated hysteresis loops. (Auth. mod.)

B-37360

Vannier, G., **Transpiration hysteresis and supercooling capacity in a subantarctic dipteran** [Hystérésis transpiratoire et capacité de surfusion chez un Diptère subantarctique], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.137-149, In French with English summary. 9 refs.

Anatalanta aptera Eaton (1875) is a wingless dipteran living on subantarctic islands (Crozet, Heard, Kerguelen). Experiments to measure transpiration rates of larval, pupal and adult stages have been carried out in airfilled cells with an electrobalance at 5 C; with the following results: the larvae display a sloping and dissociated hysteresis loop in accordance with their inefficient regulation of the transpiration rate; the pupae display a horizontal hysteresis loop that parallels the temperature axis of the graph indicating that they are temperature independent and drought-tolerant; the adults show an imbricated and inclined hysteresis loop related to their capacity to control water loss although they are temperature dependent. At sub-zero temperatures the experiments show the following cryobiological features: as an actograph, the electrobalance detects movements of the insect during undercooling; the chill-coma temperature is apparent when the individual remains motionless (in 10 adults, the chill-coma temperature averaged -2.11 C); prior to the supercooling point, a small change in transpiration rate is observed on the water loss curve; this only occurs in live individuals. This event is called the microgravimetric pre-freeze event and occurs at -6.04 C; coinciding with the supercooling point, a rapid change in mass is recorded due to the liberation of latent heat during ice crystallization. The SCP mean of the 10 tested adults is at -8.22 C. (Auth. mod.)

B-37361
Vernon, P., Vannier, G., **Experimental study of the cold tolerance in adults of a subantarctic dipteran, *Anatalanta aptera* (Sphaeroceridae)** [Etude expérimentale de la tolérance au froid chez les adultes d'un Diptère subantarctique: *Anatalanta aptera* (Sphaeroceridae)], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.151-167, In French with English summary. Refs. p.165-167.

Measurements of cold tolerance in adult specimens of *Anatalanta aptera* from Possession I. show the following: fed juveniles are characterized by a lower supercooling point (S.C.P.) than fed mature adults; after 60 days of starvation, the adults show significantly higher mean values of the S.C.P. and of the freezing point (F.P.) compared to fed mature adults; S.C.P. values are inversely correlated with total lipid contents of the tested males and females; there is no significant sex-linked difference of the S.C.P. or the F.P. between fed or starved mature adults; all adults are susceptible to freezing; their remarkable fasting performance is associated with a decrease of their resistance to cold and connected to lipid consumption. (Auth. mod.)

B-37362
Seppelt, R.D., Hughes, J.M.R., **Contrasts in vegetation pattern: Heard Island and Macquarie Island,** *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.171-175, 9 refs.

Heard I. (53S) lies south of the Antarctic Convergence, is remote in terms of a propagule source and is 80% ice-covered, resulting in few available habitats for colonization. Macquarie I. (54S) lies north of the Antarctic Convergence, is closer to a continental land mass, has no permanent ice or snow and has a potentially far greater area available for colonization. These differences are reflected in the distribution and composition of the flora and vegetation of the respective islands. The vascular flora of Heard I. includes 8 species in 5 community types (maritime grassland, herbfield, fellfield, cushion carpet, pool complex). Forty-five vascular species have been recorded for Macquarie I. in 8 community types (maritime tall tussock grassland, meadow grassland, herbfield, swamp, bog, mire, fernbrake, fellfield). (Auth.)

B-37363
Downing, A.J., Seppelt, R.D., Selkirk, P.M., **Analysis of bryophyte distribution patterns on subantarctic Macquarie Island,** *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.177-182, 7 refs.

With the exception of closed stands of *Poa foliosa* tall tussock grassland, bryophytes form a significant component of all vegetation formations on Macquarie I. This study, using a computer data base program, has shown that useful information on distribution patterns, associations and habitat preferences can be obtained from herbarium labels or field collection data. With an expanded data base the predictive value of the program is considerably enhanced. (Auth.)

B-37364
Jolinon, J.C., **Adventitious Phanerogams on Amsterdam Island** [Les Phanérogames adventices sur l'île Amsterdam], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.183-188, In French with English summary. 19 refs.

Study of plant ecology on Amsterdam I. shows that, due to destruction of indigenous plants by frequent fires and grazing cattle, the prevailing vegetation up to 250 m above sea level consists of adventitious plants such as *Cirsium vulgare* and *Conyza canadensis,* and that *Philica nitida,* the only tree indigenous to the island and unique in austral regions, is being threatened with extinction. Tables showing types, frequency indexes, distribution and origin of Phanerogams found on Amsterdam I. are provided. (Auth. mod.)

B-37365
Smith, R.I.L., Coupar, A.M., **Colonization potential of bryophyte propagules in antarctic fellfield soils,** *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.189-204, 11 refs.

Two experiments are described which examine the nature of the propagule banks and their potential as a source of pioneer colonist plants in soils from fellfield sites of different age, vegetation complexity and edaphic characteristics at Signy I. The optimum temperature range for germination and growth was 15-20 C, although a few species developed slowly at 5 C. The addition of dilute NPK nutrient solution accelerated bryophyte development at low temperatures but did not affect the number of species represented or the biomass. Those taxa which appeared on the incubated soils were generally typical of the island's fellfields and almost all occurred *in situ* at the corresponding site from which the soils were sampled, although several were disproportionately represented. However, the dominant fellfield species were notably absent. The importance of certain environmental factors in the development of bryophyte propagules is discussed. (Auth. mod.)

B-37366
Cowling, A.J., Smith, H.G., **Protozoa in the microbial communities of maritime antarctic fellfields,** *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.205-213, 23 refs.

In contrast to comparable communities in the temperate zone, almost all the protozoan biomass in unvegetated fellfield fines in Signy I. consists of a single species of colorless flagellate. During the summer 1983-84, the populations were determined, representing a standing crop biomass of 2.5 micrograms/sq cm. The population levels were positively correlated with the moisture content of the fellfield fines ($r=0.763$). The dominant flagellate species has been isolated as *Heteromita globosa* Stein by light and scanning electron microscopy. This species shows rapid growth at 5 C with an indigenous strain of *Pseudomonas* sp. as the sole source of nutrients. The success of this protozoan on this and other bacterial strains isolated from antarctic materials suggests that its feeding may constitute an important process in the community dynamics. (Auth. mod.)

B-37367
Frenot, Y., **Organization of earthworm communities on Possession Island, Crozet Islands** [Organisation des communautés de vers de terre de l'Ile de la Possession, archipel Crozet], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.215-230, In French with English summary. 15 refs.

Ten species and subspecies (Oligochaeta Acanthodrilidae and Phreodrilidae) occur at Possession I. but only one Lumbricidae, *Dendrobaena rubida tenuis,* currently colonizes the site of the Alfred-Faure Station. The organization of the earthworm communities in different ecological systems is described; specific composition, density and biomass are analyzed. The concept of "community" is discussed because it appears that each species or subspecies distribution depends on such environmental factors as salinity, soil, moisture, and organic matter. Since the characteristics of a habitat allow to determine the specific composition of earthworms, it is suggested that the term "collection" is more appropriate than the term "community". (Auth. mod.)

B-37368
Bellido, A., Cancela da Fonseca, J.P., **Principal features of the population structure of littoral oribatid mites from the Kerguelen Islands** [Principaux facteurs de la structuration du peuplement d'acariens oribates d'une pelouse littorale aux Iles Kerguelen], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.231-240, In French with English summary. 16 refs.

A quantitative study of an oribatid mite community, carried out on monthly samples of a *Crassula moschata* halophilous turf during 2 years, is described. Two facies related to soil moisture are compared: dry (upper zone) and wet (lower zone). An additional feature of the latter is its higher salinity content. Two main species are identified: *Antarcticola* sp. cf. *georgiae* Wallwork (Podacaridae) found mainly in the upper zone and *Oppia crozetensis* Richters (Opiidae), in the lower. A third species, *Liochthonius* sp. cf. *mollis* Hammer occurred in low numbers and only during one season. The mean abundance of the other 2 species shows little seasonal fluctuation, which differentiates subantarctic oribatid mite communities from other communities. (Auth. mod.)

B-37369
Tréhen, P., Vernon, P., Delettre, Y., Frenot, Y., **Organization and dynamics of Diptera populations from Kerguelen Islands. Evidence of modifications linked to insularity** [Organisation et dynamique des peuplements diptérologiques aux Iles Kerguelen. Mise en évidence de modifications liées à l'insularité], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.241-253, In French with English summary. 13 refs.

The distribution of 4 species of Diptera on Croÿ I. is compared with that on Kerguelen Is. in terms of changes in ecological requirements, i.e. phycophagy, necrophagy, saprophagy and phytophagy, related to the size and topography of the islands and the impact of seals and penguins. Two species of Diptera show different mechanisms of evolution of their respective ecological niche, which is attributed to the great ability to disperse, in *Antalanta aptera* and to diet plasticity, in *Calycopteryx moseleyi.* (Auth. mod.)

B-37377
Putt, M., Rivkin, R.B., Prézelin, B.B., **Effects of altered photic regimes on diel patterns of species-specific photosynthesis. 1. Comparison of polar and temperate phytoplankton,** *Marine biology,* 1988 97(3), p.435-443, 46 refs.

Diel patterns of photosynthesis were measured for 2 polar diatoms *(Cosinodiscus* sp. and *Porosira pseudodenticulata)* collected in Sep. 1985 from McMurdo Sound, and 4 temperate dinoflagellates *(Gonyaulax hyalina, Gymnodinium splendens, Dinophysis caudata,* and *Glenodinium* sp.) collected in July 1985 and Jan. 1986 from the Southern California Bight, California. For phytoplankton incubated under 3 combinations of photoperiod and irradiance, distinct diel patterns of light-saturated and light-limited photosynthesis were found for different species isolated from the same environment, and for polar diatoms and temperate dinoflagellates. The range of values of the ratio of maximum to minimum rates of photosynthesis was similar for polar diatoms and temperate dinoflagellates. The results of this study suggest that changes in irradiance or photoperiod could influence species-specific patterns of photosynthesis in nature. As a consequence, in light-limited environments differential reproductive success could result from these diel patterns, and ultimately be reflected in temporal and spatial differences in community structure. (Auth. mod.)

B-37378
Kirkwood, J.M., Burton, H.R., **Macrobenthic species assemblages in Ellis Fjord, Vestfold Hills, Antarctica,** *Marine biology,* 1988 97(3), p.445-457, Refs. p.456-457.

A study was made of the sub-littoral benthic environment of Ellis Fjord, a 10 km-long fjord located near Davis Station from Nov. 1984 to Feb. 1986. The 4 major substratum types in Ellis Fjord were sand, rock, *Serpula narconensis* colonies and *Phyllophora antarctica* thalli. *S. narconensis* colonies supported the most species and sand substrata supported the least. *P. antarctica* is the only macrophyte species which occurred in the fjord, and the fjord's *S. narconensis* colonies form one of the largest known tubeworm reefs in the world. The assemblages of benthic species in Ellis Fjord were different from those seen at other sub-littoral benthic sites off the Vestfold Hills, and at other antarctic sites. There was a far greater proportion of filter-feeding species in the fjord than at other sub-littoral benthic sites off the Vestfold Hills. Factors which are thought to have caused these differences are the high level of organic but low level of inorganic input into the benthic system of the fjord, and the absence of anchor ice from the fjord. (Auth. mod.)

B-37379
SCAR/SCOR/IABO/ACMRR, **Report of the BIOMASS Data Analysis Workshop on Antarctic Phytoplankton/Zooplankton Relationships (Indian Ocean and Pacific sector of the southern ocean),** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* Apr. 1988 No.56, 39p.

This is a report on a BIOMASS Workshop on phytoplankton/-zooplankton relationships, held in College Station, TX, USA, Oct. 14-16, 1987. Its objective was to provide a technical forum for the analysis, comparison and discussion of data on antarctic phytoplankton and zooplankton (including krill) in the Pacific and Indian sectors of the southern ocean, and how they interrelated. Emphasis is placed on relevant data obtained during FIBEX and SIBEX 1 and 2. Data from other cruises are also considered. This Workshop followed one having a similar topic in Sao Paulo, Brazil, where the phytoplankton/-zooplankton relationships in the Atlantic sector of the southern ocean were discussed. Recommendations from that Workshop are presented in Appendix 2 of this report. A list of the participants is attached as Appendix 1. A guide to the operation and potential of the BIOMASS Data Centre, presented by the British Antarctic Survey, is also appended.

B-37380
Atlas of Polish oceanographic observations in antarctic waters, 1981, Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS). Special issue, Cambridge, England, Scott Polar Research Institute 1985, 83p., Refs. p.80-83.

Presented are results of physical and biological investigations in the Drake Passage and the Bransfield Strait carried out by the Polish research vessel R.V. *Professor Siedlecki,* from Feb. 14 to Mar. 21, 1981, with the principal objective of estimating krill biomass hydroacoustically. Physical, chemical, biological and ecological data are presented in 52 charts, covering hydroacoustics, oceanography, organic chemistry and microbiology, plankton, krill biology, ichthyology, and ornithology.

B-37388
El-Sayed, S.Z., ed, Tomo, A.P., ed, Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983, **Antarctic aquatic biology,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, 222p., Refs. passim. For individual papers see B-37389 through B-37404, B-37407, E-37405 and E-37406.

This volume consists of a collection of papers presented at the first symposium dedicated to research activities in the Antarctic Peninsula region. The symposium, attended by 75 scientists representing 9 countries, was divided into 6 sessions: Phytoplankton, Zooplankton (including krill and ichthyoplankton), Benthic Ecology, Fish Systematics and Fish Ecology, Marine Mammals, and Limnology. The papers drew heavily on results of the investigations carried out during FIBEX.

B-37389
El-Sayed, S.Z., **Biological productivity of antarctic waters: present paradoxes and emerging paradigms,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.1-21, Refs. p.17-21.

This paper discusses the development of the study of antarctic phytoplankton through its 4 phases: reconnaissance, intensive collection and cataloguing, ecology, and population dynamics. It provides an overview of the current knowledge of phytoplankton standing crop and primary production. The paradoxes presented by the present understanding of phytoplankton production are also discussed. Recent studies of antarctic bacterioplankton, dissolved organic matter, nanoplankton and sea-ice algae suggest a new paradigm of the southern ocean's food web. This emerging paradigm shows a food web of considerable complexity, including pico-, nano- and micro-plankton producers and consumers together with bacterial secondary producers. The classic antarctic food chain, diatom to krill to whale, may constitute but a part of the energy flow within the antarctic marine ecosystem. (Auth. mod.)

B-37390
Uribe, E., **Antarctic phytoplankton of the Bransfield Strait and adjacent waters,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.23-38, 31 refs.

Low values of chlorophyll *a* were found in the central part of the Bransfield Strait (0.5 mg/cu m) with the highest values (7 mg/cu m) near the South Shetland Is. and the Antarctic Peninsula. Chlorophyll concentration correlated well with observed phytoplankton densities. Fifty-four species of phytoplankton were identified in 42 samples, with *Chaetoceros tortissimus* accounting for 58% of the total cell numbers. Diversity indices ranged from <1 to <3, with high values in the center of the Strait, decreasing northward. Possible factors affecting the distribution of phytoplankton are discussed in relation to published values of nutrients and the distribution of krill. The hypothesis is proposed that krill concentrations are related to the presence of water mass mixing rather than to phytoplankton abundance. (Auth. mod.)

B-37391
Ferrario, M.E., Ferreyra, G.A., **Diatoms of the South Orkney Islands,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.39-52, 23 refs.

From a preliminary examination of the diatoms collected from 14 stations in the South Orkney Is. area during a FIBEX cruise in 1981, 56 taxa were identified and 3 inter-specific associations were recognized. The most abundant and widely distributed species were *Nitzschia cylindrus* (Grun.) Hasle, *N. pseudonana* (Has.) Hasle, *N. curta* (V. Heurck) Hasle and *Thalassiosira gracilis* (Karst.) Heustedt. The least common species were *Actinoptychus senarius* (Ehr.) Ehrenberg, *Diploneis papula* var. *constricta* Hustedt and *N. panduriformis* var. *minor* Grunow—species that are rarely if ever reported from antarctic waters. A supplementary examination of the stomachs of krill captured at one station indicated that *N. curta* was taken as food more frequently than *N. cylindrus,* probably being captured more readily because of its greater size. (Auth.)

B-37392
Dinofrio, E.O., **Planktonic copepods of waters near the South Orkney Islands,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.53-65, 2 refs.

From 72 samples of zooplankton collected during a cruise of the RV *Dr. Eduardo Holmberg* in Jan. and Feb. 1981, at various depths of water near the South Orkney Is., 19 species of copepods were identified. The most frequent and abundant were *Calanus* spp. followed by *Metridia gerlachei, Ctenocalanus vanus* and *Calanoides acutus.* The spatial correlations between the most important species were determined in order to define their vertical distribution. Three assemblages were distinguished: species predominant above 50 m, those that were concentrated between 50 and 100 m, and species predominant below 50 m at noon that migrated to the surface at night. (Auth. mod.)

B-37393
Hubold, G., **Current problems in antarctic krill and zooplankton research,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.67-72, 4 refs.

There are large gaps about the early life history of krill as well as in the mutual interactions between the larvae, zooplankton and the environment. The preliminary results of FIBEX investigations presented in Bremerhaven (May 1983) during the meeting of the SCAR Group of Specialists on Krill Research are discussed, as is the suggestion of an experimental energetics program to derive a mass budget of krill growth. The final objective in investigating the life history of krill is to set up models which will allow prediction and description of the fluctuations of krill populations during the course of a year, as well as from year to year. The energy flow through predators and

competing zooplankton and their ecology has to be analyzed with similar intensity to arrive at an overall picture of how the antarctic pelagic system works. (Auth. mod.)

B-37394

Gallardo, V.A., **Benthic microinfauna of antarctic sublittoral soft bottoms,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.73-86, Refs. p.84-86.

The antarctic benthic habitat provides abundant hard bottoms for the biota—a condition favoring the development of an important soft bottom *epifauna* which has received more attention than the typical *infauna.* The emphasis on zooplankton evidently derived from the recognition that the krill is the main component of the antarctic ecosystem. Data on biomass, faunal composition, species richness and diversity are reviewed. Attention is directed to the need to standardize methodologies while simultaneously stressing quantitative investigation of benthic communities, not only because of the need to understand the factors regulating the distribution, abundance and structure of these communities, but also because these studies are required to monitor the changes in the antarctic ecosystem. (Auth. mod.)

B-37395

Lopretto, E.C., ***Zonophryxus quinquedens* Barnard (Isopoda, Epicaridae, Dajidae) in South Orkney Islands waters,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.87-97, 8 refs.

A detailed morphological description is given of the mouth parts and thoracic appendages of both sexes of *Zonophryxus quinquedens* Barnard, including structures in female specimens known as 'maxillae' and 'pleopoda', for which original drawings and photographs are reproduced. The possible metamorphosis of both sexes is discussed and a key is provided for the specific identification of the *Zonophryxus* females described to date. Although the specimens were collected independently of their presumed hosts, the presence of *Z. quinquedens* in the vicinity of the South Orkney Is. suggests that it has a discontinuous distribution in antarctic waters. (Auth. mod.)

B-37396

Barrera Oro, E.R., Tomo, A.P., **Feeding and ecology of *Notothenia larseni,* Lonnberg,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.99-106, 10 refs.

An analysis is presented of the diet of *Notothenia larseni* Lonnberg 1905 as judged by the stomach contents of samples captured during cruises in the 1970s around islands in the Atlantic sector of the southern ocean. The habitat and trophic level of this species of antarctic cod are discussed in relation to its feeding habits. (Auth.)

B-37397

Siegfried, W.R., Croxall, J.P., **Techniques for assessing interactions between seabirds and food resources in the southern ocean,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.107-116, Refs. p.113-116.

Developments up to 1983 and future requirements in selected aspects of studies of the role of seabirds as consumers of marine resources in the southern ocean (namely, the region south of the Polar Front) are reviewed. Topics covered include the distribution and abundance of breeding birds, demography, diet, energetics, activity budgets and the remote recording of activities at sea. (Auth.)

B-37398

Visbeek, J.G., Fontana, L.R., **Factors regulating the distribution patterns of seabirds,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.117-124, 8 refs.

Seabird censuses were conducted during Jan. and Feb. 1981 on board RV *Dr Eduardo Holmberg,* near the South Orkney Is., Scotia Sea. Data were analyzed using a Variance Analysis Model to determine the relationship between seabird distribution and a range of environmental factors, from which the effect of wind and sea conditions on seabird counts was clearly evident. Other factors studied were distance to land, air temperature, time of day and season. (Auth.)

B-37399

Siniff, D.B., **Antarctic seal life history patterns and the management of southern ocean resources,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.125-131, Refs. p.129-131.

This paper views the possibilities of using population aspects of the 4 species of antarctic seal, *Leptonychotes weddelli* (Weddell seal), *Lobodon carcinophagus* (crabeater seal), *Hydrurga leptonyx* (leopard Seal), and *Ommatophoca rossi* (Ross seal) for ecosystem monitoring. The life history and population parameters of these antarctic seals are discussed. Certain aspects of ecosystem monitoring are considered, with specific reference to antarctic seals for monitoring purposes. Sources of variations and their effects on the interpretation of ecosystem changes are discussed. (Auth.)

B-37400

Espeche, M.E., Molina, M.G., Fraile, E.R., **Enzymatic activities of psychrotrophic bacteria from antarctic krill,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.133-139, 16 refs.

The extracellular enzyme activity of bacterial strains isolated from antarctic krill was studied, particularly with respect to the causes of spoiling of stored krill. Proteolytic activity was found in all the groups tested apart from *Moraxella.* Of Shewan's group II *Pseudomonas,* 30% displayed chitinase activity, 11% collagenase activity, and over 90% showed activity on other substrates. Although group III-IV *Pseudomonas* did not produce chitinase, 10% showed collagenase activity, with varying degrees of enzymatic activity on other substrates. Most bacterial strains tested showed phosphatase activity. Some *Moraxella* strains had lipolytic (16%) and deoxyribonuclease (12%) activity, which was also found in all the genera examined. *Flavobacterium* showed no deoxyribonuclease activity. Chitinolytic activity was observed in 17% of *Alcaligenes* strains and in 33% of the coryneform group. (Auth.)

B-37401

Márquez, M.E.I., Sanahuja, J.C., **Polymorphism of phosphoglucomutase (PGM) in antarctic krill, determined by the isoelectric focusing technique (IEF),** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.141-148, 8 refs.

The variations of phosphoglucomutase (PGM) activity in samples of antarctic krill taken from 2 different areas are described. The prepared enzyme samples, on agarose gel, were subjected to electrophoretic analysis using the horizontal isoelectric focusing technique (IEF), with a predetermined pH gradient. The heterogeneity of the observed electrophoretic patterns indicated the polymorphism of the enzyme. The allele distributions suggest that there were no gene frequency differences among the krill samples studied. It is acknowledged that further loci need to be studied in order to determine the population structure of *Euphausia superba.* (Auth. mod.)

B-37402

Tradatti, C.E., Badran, A.F., **Biological effects of natural and artificial antifreezes,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.149-156, 16 refs.

All antarctic fish studied have been found to contain biological antifreezes in their body fluids. These antifreezes belong to a family of glycoproteins that differ in molecular mass, but have similar chemical composition. This study was designed to demonstrate other physiological activities of biological antifreezes, including the capacity to activate or protect enzyme function, particularly the activity of enzymes involved in various mammalian metabolic reactions at different temperatures. It was found that biological antifreezes can protect the effect of glutamate decarboxylase, the activity of which at 1 C, in the presence of either biological antifreezes or of the abiotic dimethylsulphoxide, was similar to that at 37 C. However, no effect was observed with lactate dehydrogenase activity. (Auth. mod.)

B-37403

Heywood, R.B., **Limnological studies in the Antarctic Peninsula region,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.157-173, Refs. p.171-173.

Freshwater research on Signy I., carried out by British scientists, is reviewed. Description and discussion cover the biotic and abiotic factors controlling photosynthesis and nutrient cycling. Tables and charts show major environmental factors influencing the characters of upland and lowland lakes, such as seasonal changes in phytoplankton biomass and activity in the light regime in nutrient-enriched and nutrient poor lakes, numbers of bacteria, and annual data for the carbon cycle in the trough of 2 Signy I. lakes.

B-37404

Paggi, J.C., **Limnological studies in the Potter Peninsula, 25 de Mayo, Island, South Shetland Islands: biomass and spatial distribution of zooplankton,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.175-191, Refs. p.190-191.

Some aspects of zooplankton ecology of 27 freshwater bodies, mainly ponds in the ice-free area of Potter Cove, studied in the summer of 1978, are described and discussed. The composition of the zooplankton is notably poor and homogeneous, with two rotifers and two crustacean species dominating. Values of density and biomass varied from 0 to 20 742 individuals/cu m and from 0 to 400 mg/cu m, respectively. The crustaceans, in particular, display a nocturnal migratory behavior. From a correlation analysis and 'polar ordination', some positive significant relationships are found between the biomass of the crustaceans and the cover of aquatic vegetation, abundance of terrestrial vegetation in the drainage basin, ice occurrence, degree of isolation, proximity to the sea and the successional processes. (Auth. mod.)

B-37407

Guzman, G.S., **Coastal lichens in the South Shetland Islands,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.219-222, 8 refs.

Communities of lichens in the South Shetland Is. generally form discrete units that may be characterized, in most cases, according to their floristic composition and some elements of the habitat, e.g., the substratum. Thus, it is possible to recognize communities growing among mosses, with species such as *Sphaerophorus globosus, Stereocaulon alpinum* and *Cladonia* spp. Terricolous communities,

with such species as *Leptogium puberulum,* are frequently associated with *Placopsis contortuplicata.* Saxicolous communities may be classified according to such criteria as nitrophily or salinity tolerance. Ornithocoprophilous communities, i.e., those located adjacent to sites where birds nest, are characterized by such species as *Ramalina terebrata, Haematomma erythromma* and *Caloplaca regalis,* and littoral communities by species such as *Verrucaria* spp. and *Caloplaca* spp. (Auth. mod.)

B-37409

Ling, J.K., ed, Bryden, M.M., ed, **Studies of sea mammals in south latitudes,** Adelaide, South Australian Museum, 1985, 132p., Refs. passim. For selected papers see B-37410 through B-37416.

DLC QL737.P6S83

This is a collection of papers presented at a symposium on southern sea mammals at the annual meeting of the Australian and New Zealand Association for the Advancement of Science in 1982. The scope of the symposium included current information about seal species from southern temperate waters around Australia, New Zealand and South Africa, reproduction and lactation in antarctic seals, paleontological investigations of Southern Hemisphere cetaceans, and the results of aerial surveys of whales around the Australian coast.

B-37410

McCann, T.S., **Size, status and demography of southern elephant seal *Mirounga leonina* populations,** Studies of sea mammals in south latitudes. Edited by J.K. Ling and M.M. Bryden, Adelaide, South Australian Museum, 1985, p.1-17, Refs. p.15-17.

DLC QL737.P6S83

The current status of southern elephant seal population is reassessed using original census data from all major breeding sites. Methods for evaluating annual pup production from counts at breeding beaches are reviewed in detail and a relationship derived, based on counts of cows alone, which is shown to be more accurate than those previously used. Life tables, based on data from Macquarie I. and South Georgia, are constructed and used to estimate relationships between pup production and total population size. The total population of all animals older than pups of the year is calculated to be 3.5 times annual pup production. The total population of southern elephant seals is estimated as approximately 750,000, which is 10-25% greater than hitherto suggested. In the light of this, new estimates of population biomass and food consumption are derived. These suggest that the stocks of fish in the waters around South Georgia and Kerguelen have been underestimated. (Auth.)

B-37411

Burton, H.R., **Tagging studies of male southern elephant seals *(Mirounga leonina* L.) in the Vestfold Hills area, Antarctica, and some aspects of their behaviour,** Studies of sea mammals in south latitudes. Edited by J.K. Ling and M.M. Bryden, Adelaide, South Australian Museum, 1985, p.19-30, 16 refs.

DLC QL737.P6S83

Resightings of tagged seals suggest migration between Antarctica and subantarctic islands. The summer minimum of immature seals on the mainland beaches of the Vestfold Hills occurred about a month earlier (mid-Jan.) than on Macquarie I. and Heard I. Very young seals (<2 m in length) appeared and moulted on the mainland beaches when sea ice broke out early and allowed them access; it is suggested that sea ice break-out is a necessary but not a sufficient factor determining the arrival time of the first seals for the autumn-winter haul-out. During cyclonic weather conditions (wind speed >75 km/h (40 knots), daily wind run >650 km), seals already hauled out on Davis Beach departed in significant numbers. (Auth. mod.)

B-37412

Griffiths, D.J., **Endocrine regulation of seasonal breeding in the male southern elephant seal *(Mirounga leonina)* at Macquarie Island,** Studies of sea mammals in south latitudes. Edited by J.K. Ling and M.M. Bryden, Adelaide, South Australian Museum, 1985, p.31-40, Refs. p.39-40.

DLC QL737.P6S83

The testes of male elephant seals at Macquarie I. have been shown to be quiescent from Dec. to July inclusive. The first sperm were released from the seminiferous epithelium in Aug., but did not reach the tail of the epididymis until Sep. During Sep. and Oct. the seminiferous tubules remained fully active, but in Nov. there was a reduction in elongated spermatid (sperm) production and a loss of round spermatids into the lumen as the Sertoli cells regressed. The changing functional status of the testis coincided with histological changes in the pituitary gland. Pineal gland mass, relative to body weight, increased during the winter and fell during spring and summer in a cycle that was significantly correlated to day length. The high level of pineal gland activity during months of short day length suppresses pituitary gonadotrophic activity and reduces the gonadotroph population, which in turn leads to inactivation of the testes. As day length increases, pinealocytes decrease in size and activity, the gonadotroph population of the pituitary increases and the increasing gonadotrophin output initiates the onset of spermatogenesis. (Auth. mod.)

B-37413

Tedman, R.A., **Weddell seal, *Leptonychotes weddelli,* at McMurdo Sound, Antarctica: milk production in relation to pup growth,** Studies of sea mammals in south latitudes. Edited by J.K. Ling and M.M. Bryden, Adelaide, South Australian Museum, 1985, p.41-52, Refs. p.50-52.

DLC QL737.P6S83

Weddell seal pups are born on the snow-covered sea ice in late Oct. and early Nov. The birthweight is doubled in 11 days and increased by about 5 times at the end of the 6 to 7 weeks nursing period. The pups are largely or solely dependent on milk from the mother for growth during this period; suggesting, initially that the rapid growth rate results from a highly active mammary gland. Except for a gland cistern at the base of each of the 2 nipples and several large-diameter milk ducts which probably act as reservoirs for milk secreted between and during suckling periods, there are no gross anatomical adaptations in the mammary glands to explain the rapid growth of the sucking pup. The quantity of milk consumed by the young decreases during the nursing period while the fat content of the milk remains at a high level. The growth rate of Weddell seal young decreases after the second week post-partum in conjunction with a decreased frequency and total duration of sucking due to increased swimming activities and decreased sleeping time by the young. The rapid growth rate of Weddell seal young is probably due more to the very high calorific content of the milk (due to the high fat content) than the intake of abnormally large volumes of milk. (Auth. mod.)

B-37414

Warneke, R.M., Shaughnessy, P.D., ***Arctocephalus pusillus,* the South African and Australian fur seal: taxonomy, evolution, biogeography, and life history,** Studies of sea mammals in south latitudes. Edited by J.K. Ling and M.M. Bryden, Adelaide, South Australian Museum, 1985, p.53-77, Refs. p.75-77.

DLC QL737.P6S83

There is general agreement that otariid seals evolved in the North Pacific Ocean some 12 to 13 million years ago. A prototype with all the modern specializations of the family entered the Southern Hemisphere about 5 million years ago, presumably when a continuum of cold-water habitat existed along the eastern Pacific seaboard. Subsequent colonization throughout the southern ocean led to a modest

diversification into a suite of species currently placed in the fur seal genus *Arctocephalus*. A map showing the distribution of *Arctocephalus* species and the sea lions *Neophoca, Phocarctos* and *Otaria* in the Southern Hemisphere is provided. A recent record of *A. pusillus* at Marion I. in the Prince Edward group is mentioned. (Auth. mod.)

B-37415

Fordyce, R.E., **History of whales in the Southern Hemisphere,** Studies of sea mammals in south latitudes. Edited by J.K. Ling and M.M. Bryden, Adelaide, South Australian Museum, 1985, p.79-104, Refs. p.99-104.

DLC QL737.P6S83

Cetaceans have inhabited southern waters for over 40 million years from the Late Eocene to the present. Fossils occur in marine and freshwater sediments in Australia, New Zealand, South America, the Antarctic Peninsula and Africa. There are few records from the open oceans. Families of archaeocetes, odontocetes, and mysticets represented by austral fossils include the extinct Basilosauridae, Cetotheriidae, Squalodontidae, Rhabdosteidae, Kentriodonitade and many problematic taxa, and the extant Balaenopteridae, Balaenidae, Ziphiidae, Physeteridae, Delphinidae, Iniidae and Pontoporiidae. Interpretation of the evolution and zoogeography of austral Cetacea is hampered by inconsistent taxonomy, uncertain stratigraphy and an incomplete fossil record. Thus, the fossils provide conclusive evidence of neither major changes in taxonomic diversity from the Late Oligocene to Recent nor rates of evolution; however, they caution against notions of low diversity during the Oligocene or of gradualistic evolution. Southern fossils support the ideas of cetacean monophyly and the rapid evolution of odontocetes and mysticetes early in the Oligocene. (Auth. mod.)

B-37416

Bannister, J.L., **Southern right *(Eubalaena australis)* and humpback *(Megaptera novaeangliae)* whales off Western Australia: some recent aerial survey work,** Studies of sea mammals in south latitudes. Edited by J.K. Ling and M.M. Bryden, Adelaide, South Australian Museum, 1985, p.105-113, 10 refs.

DLC QL737.P6S83

Aerial surveys have been undertaken off Western Australia for right and humpback whales since 1976 to provide evidence of population status since protection from hunting (1935 for right whales, 1963 for humpbacks). A possible increase is reported for right whales off the south coast. For humpbacks, a significant increase has occurred off Shark Bay where the numbers in 1982 (113 in 10 flying days) were more than twice those reported in 1963, the last year of commercial hunting there. Together with humpbacks, baleen whales such as blue, fin, sei and minke whales rely on an intensive summer feeding period in the Antarctic. With a reduction of over 80% in their numbers through whaling, and consequent availability of their food, *Euphausia superba* there have been increases in other krill-feeding animals such as seals, penguins and some fish to the extent that concern is now being expressed over the ability of baleen whales ever to rebuild to their former numbers. (Auth. mod.)

B-37418

Strange, I.J., **Falklands' Johnny rook,** *Natural history,* Feb. 1986 95(2), p.54-61.

The raptor and scavenger, caracara, is isolated on one of the small islands of the Falklands Group. The bird is struggling to survive through extreme versatility and adaptability in its feeding habits. The island which it inhabits is also the nesting site for penguins, albatross, petrels, seals, and sea lions. From Oct. through Mar. the caracara has an ample, available food supply from the bird colonies; from Apr. through Sep. it has to forage on marine mollusks, small invertebrates of the tussock grass, sick or aging penguins staying the winter, regurgitated leftovers from summer, and seal excrement. Flexible and agressive foraging has enabled caracara to survive and maintain a constant 60 breeding pairs in the Falklands Group.

B-37419

Hindell, M.A., **Diet of the King Penguin *Aptenodytes patagonicus* at Macquarie Island,** *Ibis,* Apr. 1988 130(2), p.193-203, 23 refs.

The diet of King Penguins at Macquarie I. was studied between Nov. 1984 and Nov. 1985 based on stomach flushed samples (obtaining 93% of the total stomach content) from 10 birds each month. The mean stomach content mass of the 118 samples was 923.0 g. Percentage by number, percentage by weight and dietary coefficient analysis all showed the main prey of the penguins to be myctophid lantern fish of the species *Electrona carlsbergi* and *Krefftichthys anderssoni.* Juvenile fish of both species were eaten from Dec. to July, and adults in Aug. and Sep. Cephalopods were relatively unimportant in contrast to previous indications. The amount of food brought ashore and the composition of the diet varied over the year, with *K. anderssoni* the dominant food in all but the winter months when *E. carlsbergi* replaced it as the principal food item. (Auth.)

B-37424

Croxall, J.P., McInnes, S.J., Prince, P.A., **Status and conservation of seabirds at the Falkland Islands,** *International Council for Bird Preservation. ICBP technical publication,* 1984 No.2, ICBP Seabird Conservation Symposium, 1982: Status and conservation of the world's seabirds, edited by J.P. Croxall, P.G.H. Evans, and R.W. Schreiber, p.271-291, 53 refs.

DLC QL676.5.I27 1982

Published (to 1982) and unpublished data on the location and size of breeding colonies of Falkland Is. seabirds are presented, and rough estimates are made of the total breeding population of each species. The Falkland Is. contain breeding sites for albatross, penguins, prions, petrels, skuas, gulls and shags. Seabird populations were drastically reduced in historical times by killing penguins for oil, by persistent large-scale egg-collecting and by extensive destruction of tussock grassland. Serious present threats are predation by cats and rats. Potential problems include the results of recent habitat destruction and disturbance, enhanced risks of oiling and perhaps the effects of fishery and agricultural developments. While a good number of wildlife reserves exist on the islands, and especially off the west coast of West Falkland, some species are still not adequately protected. Priorities are suggested for survey work, with special attention to burrowing species, the presence of cats and rats, and use of aerial photographic techniques; research, particularly dietary studies and estimating the abundance of burrowing species; and direct action, involving removal of cats from key sites and development of reserves and facilities to cater for the likely increases in human population and tourism. (Auth. mod.)

B-37425

Rounsevell, D.E., Brothers, N.P., **Status and conservation of seabirds at Macquarie Island,** *International Council for Bird Preservation. ICBP technical publication,* 1984 No.2, ICBP Seabird Conservation Symposium, 1982: Status and conservation of the world's seabirds, edited by J.P. Croxall, P.G.H. Evans, and R.W. Schreiber, p.587-592, 23 refs.

DLC QL676.5.I27 1982

Twenty species of seabirds are currently known to breed at Macquarie I. Several other species also occur at the island in small numbers but their breeding status is not yet fully confirmed. The King penguin population has fully recovered, and the Wandering albatross population is fluctuating following some recovery from earlier exploitation by man. The most serious threats to breeding seabirds at present, especially the burrow-nesting species, are the degradation of habitat caused by introduced rabbits and predation by introduced cats,

black rats and wekas. Since 1933 the island has been a Wildlife Sanctuary, and in 1971 its status became equivalent to a national park. A 15-year-long program of wildlife research and management conducted on the island is now showing encouraging results in the control of introduced animals and ultimately will benefit all breeding seabird species especially those whose present status is vulnerable or uncertain. (Auth.)

B-37426

Harper, P.C., **Status and conservation of birds in the Ross Sea sector of Antarctica,** *International Council for Bird Preservation. ICBP technical publication,* 1984 No.2, ICBP Seabird Conservation Symposium, 1982: Status and conservation of the world's seabirds, edited by J.P. Croxall, P.G.H. Evans, and R.W. Schreiber, p.593-608, 65 refs.

DLC QL676.5.I27 1982

The status of the 10 or 11 breeding bird species in the Ross Sea sector is reviewed and the latest census data given. A total of 40,000 pairs of Emperor penguins breed at 6 locations; 750,000 pairs of Adélie penguins breed at 34 colonies. These figures may represent one-third of the total world populations for both species. More information is required on the 6 species of petrel nesting in the region. Population trends and threats to the birds of the Ross Sea are reviewed, and present conservation measures are discussed. The Ross Sea is a likely area for oil exploration and has potential for krill harvesting. The need for more research to safeguard the birds is advocated, and several lines of enquiry are proposed. (Auth.)

B-37427

Jouventin, P., Stahl, J.C., Weimerskirch, H., Mougin, J.L., **Seabirds of the French subantarctic islands and Adélie Land, their status and conservation,** *International Council for Bird Preservation. ICBP technical publication,* 1984 No.2, ICBP Seabird Conservation Symposium, 1982: Status and conservation of the world's seabirds, edited by J.P. Croxall, P.G.H. Evans, and R.W. Schreiber, p.609-625, 31 refs.

DLC QL676.5.I27 1982

This paper provides the first survey of the avifauna of the French subantarctic islands and Adélie Land, and gives population estimates for most of the 47 species of seabirds which breed there. The emphasis is on the Crozet islands which, with 34 species, have the most diverse community of seabirds in the world. In addition, the 3 subantarctic island groups hold the majority of the world population of certain species of penguins and Procellariiformes, notably the King penguin, Yellow-nosed albatross, Salvin's prion and Kerguelen petrel. A near-extinct species of albatross was recently discovered on Amsterdam Island, its only breeding site. Disturbance by human beings, and in particular the introduction of mammalian predators, are the biggest threats facing these communities. Population surveys need completing, and monitoring programs established or increased, at all 4 sites. All islands still in pristine condition should be totally protected, and elsewhere the influence of man and alien mammals should be controlled. (Auth.)

B-37428

Williams, A.J., **Status and conservation of seabirds on some islands in the African sector of the southern ocean,** *International Council for Bird Preservation. ICBP technical publication,* 1984 No.2, ICBP Seabird Conservation Symposium, 1982: Status and conservation of the world's seabirds, edited by J.P. Croxall, P.G.H. Evans, and R.W. Schreiber, p.627-635, 13 refs.

DLC QL676.5.I27 1982

The status (including extensive numerical data) of the 40 species of seabirds breeding at the Tristan da Cunha, Gough, Prince Edward, McDonald and Heard Islands is reviewed and the principal threats to seabirds at each island group summarized. The rich and diverse seabird populations of these islands include some of the most important colonies in the region, especially of Northern and Southern Rockhopper penguins, Yellow-nosed and Sooty albatrosses, Broad-billed prions, several *Pterodroma* petrels and Little Shearwaters. Inaccessible Island, Gough Island, Prince Edward Island, the McDonald Islands and Heard Island are entirely or largely free of alien influences. The activities of man and alien mammals have been, and remain, the main threats at all islands. The recommendations made include elimination of cats from Marion Island (and Tristan da Cunha if possible) and a detailed study (and subsequent rational management) of the exploitation of Nightingale Island seabirds by Tristan islanders. (Auth.)

B-37449

Croxall, J.P., **Seabirds of the Antarctic Peninsula, islands of the Scotia Sea, and antarctic continent between 80 deg W and 20 deg W: their status and conservation,** *International Council for Bird Preservation. ICBP technical publication,* 1984 No.2, ICBP Seabird Conservation Symposium, 1982: Status and conservation of the world's seabirds, edited by J.P. Croxall, P.G.H. Evans, and R.W. Schreiber, p.637-666, Refs. p.662-666.

DLC QL676.5.I27 1982

This region probably contains over 99 percent of the world population of Chinstrap penguins; about half the Macaroni penguins, Grey-headed albatrosses, Northern and Southern Giant petrels and antarctic prions, and possibly half the Black-bellied Storm petrels and antarctic terns. There are also large populations of most other southern ocean species, especially Emperor penguins, Gentoo penguins and Black-browed albatrosses. Although South Georgia is the most important breeding area there are very significant local concentrations of several species in each of the 7 main sub-divisions. Most penguins have increased in numbers recently; only Wandering albatross populations are decreasing, probably due to a combination of mortality factors operating outside the breeding season. Possible general threats to seabirds are pesticide residues (notably for migratory species) and increasing competition (especially for krill) from commercial fisheries. On the South Georgia mainland small petrel numbers have been seriously diminished by brown rats; at Bird I. their breeding habitat is being destroyed by antarctic fur seals. Albatrosses, especially juveniles, are subject to mortality through fishing operations. There is extensive provision for conservation measures under existing and projected legislation (the Antarctic Treaty and the new Convention). Additions and modifications are suggested in respect to seabirds. Research requirements and the principal survey needs are summarized. (Auth.)

B-37450

Hoshiai, T., ed, Fukuchi, M., ed, NIPR Symposium on Polar Biology, **Proceedings of the NIPR Symposium on Polar Biology, No.1,** Tokyo, National Institute of Polar Research, 1987, 276p., Refs. passim. For selected papers see B-37451 through B-37453, B-37455 through B-37465, B-37467 through B-37470, J-37454 and J-37466.

The Symposium convened at the Institute in early December 1986 and heard papers from 51 authors on the following topics: marine environments, temporal and spatial distribution of marine primary production, ecology of zooplankton, ecology of Euphausiids, distribution of fishes and benthos, ecology of sea birds and sea mammals and ecosystem simulation, bioaccumulation of PCB and heavy metal, glacial biota, freshwater algae and inland water, and ecology of bryophytes. This volume contains 20 papers pertinent to Antarctica, the full program for the Symposium, and an author index.

B-37451
Marchant, H.J., Davidson, A.T., Wright, S.W., **Distribution and abundance of chroococcoid cyanobacteria in the southern ocean,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.1-9, Refs. p.7-9.

The abundance of phycoerythrin-containing chroococcoid cyanobacteria in the surface waters between Australia and Antarctica were determined by counts of yellow autofluorescing cells on four transects of the southern ocean in the 1985/86 austral summer and by analysis of the pigment zeaxanthin. Despite widely differing daylengths on these transects the principal determinant of cyanobacterial abundance appears to be temperature, with cell number being exponentially related to water temperature. Ultrastructural differences found in the cell wall of southern ocean cyanobacteria may indicate the presence of different strains. (Auth.)

B-37452
Marchant, H.J., Van den Hoff, J., Burton, H.R., **Loricate choanoflagellates from Ellis Fjord, Antarctica, including the description of *Acanthocorbis tintinnabulum* sp. nov.,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.10-22, Refs. p.21-22.

Enriched cultures from a 25 l sample of plankton taken from a basin at the head of Ellis Fjord, some 10 km from the open sea (2.6 C temp., 37.6-38.4 per mill salinity), contained the following loricate choanoflagellates: *Acanthoeca brevipoda, Acanthocorbis unguiculata, Diaphanoeca grandis, Stephanoeca complexa, S. norrisii, S. diplocostata,* and a new species, *Acanthocorbis tintinnabulum,* which is described. The 25 l sample was integrated over 0.8 m which encompassed the boundary layer between oxic and anoxic waters. The sample was stored at 4 C for 3 weeks and was anaerobic for that period. The species enriched from the sample were able to withstand prolonged anoxia. (Auth. mod.)

B-37453
Matsuda, O., Ishikawa, S., Kawaguchi, K., **Seasonal variation of downward flux of particulate organic matter under the antarctic fast ice,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.23-34, 13 refs.

Marked seasonal variation of particulate organic carbon (POC) flux was observed in Lützow-Holm Bay, with larger fluxes in summer (136 mgC/sq m/d) and smaller fluxes in winter (1.5 mgC/sq m/d). Particulate organic nitrogen (PON) and particulate phosphorus (PP) flux showed similar trends to POC variation; C:N:P ratio also varied seasonally. Chlorophyll *a* flux varied more drastically than POC, suggesting the direct input of ice algae and/or phytoplankton to the benthic community in summer. (Auth. mod.)

B-37455
Ikeda, T., Thomas, P.G., **Longevity of the antarctic krill (*Euphausia superba* Dana) based on a laboratory experiment,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.56-62, Refs. p.61-62.

Laboratory observations over a 6-year period were made on the intermoult period (IP), changes in body length (BL) and maturity of 3 female and 3 male krill brought from antarctic waters to Australia. While the IP was stable (range of individual means: 25.6-29.6 days), both BL and maturity changed greatly from one specimen to the next. Reversible modes shown in BL and maturity suggest that neither parameter is a good indicator of chronological age in this animal. Considering the age of krill at the beginning of this experiment (at least 1-2 year old) krill lived for 7-8 years, which is considerably longer than the previously hypothesized 2-5 year life span. (Auth.)

B-37456
Thomas, P.G., Nash, G.V., **Thelycum and spermatophore structure in the antarctic euphausiids *Euphausia superba* and *E. crystallorophias*,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.63-71, Refs. p.69-71.

The structure of developing thelyca and male spermatophore of *Euphausia superba* and *E. crystallorophias,* obtained from exuviae casted from animals maintained in the laboratory, have been examined using both light and scanning electron microscopy. This is the first report of adult *E. crystallorophias* being held in the laboratory for more than 12 months. The thelycum has a characteristic structure in both species examined, confirming its importance in the systematics of euphausiids. Differences were also observed in the shape, but not in the surface of the spermatophore between species. The spermatophores in both species were formed from numerous overlapping circular chitinous plates. Following spermatophore attachment, the thelycum in each species was observed to change, the most noticeable difference being the complete covering of *E. crystallorophias* thelycum with a chitinous substance once the spermatophore has been attached. (Auth.)

B-37457
Suh, H.-L., Nemoto, T., **Comparative morphology of filtering structure of five species of *Euphausia* (Euphausiacea, Crustacea) from the antarctic ocean,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.72-83, Refs. p.82-83.

Morphology of the filtering apparatus, in particular mesh size and filtering area, of 5 *Euphausia* species was investigated. Mesh sizes and filtering areas were measured utilizing an SEM. Among adult krill the filtering areas vary from 17.7 sq mm in *E. frigida* to 276.8 sq mm in *E. superba.* By applying sieve hypothesis, it is proposed that the presumptive lower limits of filterable particle sizes based on the morphology of fine filter meshes range 2-3 micron in *E. superba,* 8-11 micron in *E. vallentini,* 15-19 micron in *E. frigida,* 16-23 micron in *E. crystallorophias* and 27-39 micron in *E. triacantha.* In *E. superba,* the filter mesh sizes do not increase considerably with growth. In *E. triacantha,* the mean secondary setal distances increase from 28-37 micron to 41-56 micron. Species can be grouped according to the mesh sizes and filtering area: fine mesh filter feeder represented by *E. superba;* medium mesh filter feeders such as *E. vallentini, E. crystallorophias* and *E. frigida;* and coarse mesh filter feeder, *E. triacantha.* Potential food size spectra of these *Euphausia* species are discussed. (Auth.)

B-37458
Kawamura, A., **Two series of macrozooplankton catches with the N70V net in the Indian sector of the antarctic ocean,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.84-89, 21 refs.

Two series of macrozooplankton catches, using the Discovery pattern N70V net, were studied. These samples revealed that both standing crops and individual numbers of 3 copepod species, *Calanus propinquus, Calanoides acutus* and *Rhincalanus gigas,* were extremely poor in comparison with other data. The results confirm a possible change of major herbivorous copepod populations in size and/or community structure. These changes are perhaps a phenomenon related to gradual changes in quantitative relationships of relative biomass size between *Euphausia superba* and their predators, especially through the intense exploitation of rorqual whales during the past

several decades, which resulted in a 'surplus' in krill population. A possible intensified competition for food between herbivorous copepods and *E. superba* is discussed as the subject of feeding strategies. (Auth.)

B-37459

Casareto, B.E., Nemoto, T., **Latitudinal variation of the number of muscle fibres in *Salpa thompsoni* (Tunicata, Thaliacea) in the southern ocean: implications for the validity of the species *Salpa gerlachei*,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.90-104, 24 refs.

The existence of latitudinal variation in *Salpa thompsoni,* which is widely distributed and is the most abundant salp species in the southern ocean, is discussed. The number of muscle fibers of both aggregate and solitary forms of *S. thompsoni* shows a maximum at about 56S and decreases gradually towards higher latitudes. Body length varies latitudinally the same as the fiber numbers. In high latitudes of the South Pacific Ocean, *S. thompsoni* is replaced by a sibling species, *Salpa gerlachei.* These 2 species differ only biometrically in fiber numbers per muscle band, being fewer in *S. gerlachei.* However, a broad overlap in the range of muscle fiber numbers was found between the 2 species. The present results suggest that these 2 species are synonymous; *S. thompsoni* is distributed with a clinal variation from the north to the south. (Auth. mod.)

B-37460

Hoshiai, T., Tanimura, A., Watanabe, K., **Ice algae as food of an antarctic ice-associated copepod, *Paralabidocera antarctica* (I.C. Thompson),** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.105-111, 6 refs.

To investigate the food source of an ice-associated copepod, *Paralabidocera antarctica* (I.C. Thompson), the gut contents of the nauplius, copepodite and adult of this species were observed with a scanning electron microscope. Materials observed were collected in the ice-covered sea near Showa Station. Remains in the gut consisted of ice-associated diatom frustules, their fragments, and siliceous cyst-like organisms. This indicates that *P. antarctica* utilizes ice biota consisting mainly of diatoms as the main food source. (Auth.)

B-37461

Kirkwood, J.M., Burton, H.R., **Three new zooplankton nets designed for under-ice sampling; with preliminary results of collections made from Ellis Fjord, Antarctica during 1985,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.112-122, 18 refs.

Three new zooplankton nets have been designed to enable improved collection of zooplankters from ice-covered waters. These nets also enable quantitative sampling of species not adequately sampled by other methods. The first net is a vertical tow net which can be folded like an umbrella to pass through a small ice hole (10 cm). This 'Umbrella Net' takes an integrated sample of zooplankton from all sample depths. The second net is a collapsible free-fall net designed to collect mobile zooplankters capable of avoiding towed nets. This was the only net used which was capable of collecting all furcilia stages of *Euphausia crystallorophias* from Ellis Fjord. The third net is a diver-operated push net designed to collect zooplankters in the top 15 cm of the under-ice water column. Because of the high standing crop of phytoplankton at and near the under-ice surface at particular times of the year, some species of zooplankton tend to congregate there. These species, particularly *Paralabidocera antarctica,* were collected in great abundance using the push net, but were rare in samples collected by other methods. (Auth.)

B-37462

Gamo, S., **Cumacean crustaceans obtained by the 26th Japanese Antarctic Research Expedition (1984-1985), with descriptions of four new species,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.145-160, 21 refs.

Six species of cumacean crustaceans were collected by the 26th Japanese Antarctic Research Expedition (1984/85) at 3 stations off Princess Ragnhild Coast, using beam-trawls and MTD-net, in Feb. 1985. Four of them, *Vaunthompsonia laevifrons, Cyclaspis cristulata, Leucon breidensis,* and *Cumella pectinifera,* are proposed herein as new to science. Brief accounts and illustrations of the other two, *Cyclaspis* (?) sp. and *Hemilamprops* sp., are given, but the exact identification of the species is reserved until further specimens are available for study. (Auth.)

B-37463

Mehlum, F., Bech, C., Haftorn, S., **Breeding ecology of the antarctic petrel *Thalassoica antarctica* in Mühlig-Hofmannfjella, Dronning Maud Land,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.161-165, 20 refs.

Possible adaptations to breeding in a thermally hostile environment far inland on the antarctic continent include: shorter incubation, rapid growth rate of chicks, high metabolic rate and thermal insulation in newly hatched chicks compared to other procellariiform chicks. Moreover, the foraging frequency is lower, but the chick meal size higher, than for other procellariiform bird species of similar size. (Auth.)

B-37464

Honda, K., Yamamoto, Y., Tatsukawa, R., **Distribution of heavy metals in antarctic marine ecosystem,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.184-197, Refs. p.195-197.

Heavy metal concentrations in antarctic surface seawaters and some marine organisms were determined, and their distributions and bioaccumulations were discussed in comparison with other marine ecosystems. Locational difference of the heavy metal concentrations in antarctic seawater was negligible, and their concentrations were in the order of Zn.Fe>Mn>Cu>Pb.Ni>Cd>Hg. When compared to the western North Pacific, Japan Sea and Bering Sea, the concentrations of Fe, Zn, and Hg in antarctic seawater were relatively low; the Cd level was relatively high, which might be due to the upwelling of Cd-enriched deep waters to the surface. The heavy metal concentrations in antarctic marine organisms were affected by the metal concentrations in the seawater, characterized by a high accumulation of Cd and low accumulation of Hg, based on the short food chain with krill as key species, and also by a low accumulation of Fe in fishes as an adaptation to the cold water. (Auth.)

B-37465

Yamamoto, Y., Honda, K., Tatsukawa, R., **Heavy metal accumulation in antarctic krill *Euphausia superba*,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.198-204, 21 refs.

Seventy-six samples of krill, collected from the stomach contents of southern minke whales in 1984/85 and 1985/86 seasons, were analyzed, showing mean concentrations of metals as follows: Cu-12.7, Zn-9.6, Fe-3.6, Mn-0.71, Ni-0.45, Cd-0.43, Pb-0.04, Co-0.02, and Hg-0.008 microgram/wet g. Although no significant difference in concentrations of the metals with size and location was found, metal concentrations varied seasonally. High concentrations of Fe, Mn, Zn, Pb, and Hg were observed during Jan.-Feb. 1985/86, and in Jan.

1985. The concentrations of Cu, Cd, Ni, and Co were higher in Jan. to mid-Feb. 1986, and in Jan. 1985; thereafter their concentration levels, except for Cu, decreased. (Auth. mod.)

B-37467

Matsumoto, G.I., Watanuki, K., Torii, T., **Further study on the vertical distribution of organic constituents in an antarctic lake, Lake Vanda,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.219-232, 25 refs.

Total organic carbon (TOC), dissolved organic carbon (DOC), and organic constituents (hydrocarbons, fatty acids and hydroxy acids) in the particulate matter and sediment sample of Lake Vanda were studied in relation to stratification of lake water and microbial distribution. The TOC and DOC concentrations increased with depth and reached the maximum values of 48 and 38 mgC/l, repectively, in the bottom water (69.0 m). The contents of particulate fatty acids between depths of 5.0 and 50.0 m were near constant but increased abruptly from a depth of 52.5 m and attained the maximum value of 130 microgram/l at a depth of 57.5 m, then decreased to the bottom. Vertical distribution of branched fatty acids in the water column is consistent with that of bacterial population. Hydrocarbons were found only in the bottom water (67.5 and 69.0 m) and in the sediment. The high TOC and DOC concentrations in the bottom water imply the concentration of refractory organic matter over a long period of time after degradation of labile organic constituents. (Auth. mod.)

B-37468

Oguni, A., **Floristic studies on algae from inland waters of Ongul Islands and vicinity, Antarctica: I. East Ongul Island,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.233-254, Refs. p.242-243.

A freshwater algal flora of East Ongul I. is described. A total of 14 species were found in the water samples, belonging to Cyanophyceae, Chrysophyceae, Bacillariophyceae, and Chlorophyceae, respectively. *Paraphysomonas vestita* (Stokes) De Saedeleer of the Chrysophyceae was found for the first time in Antarctica. A total of 31 taxa were found in algal mat samples: Cyanophyceae, Bacillariophyceae, and Chlorophyceae, respectively. The following 21 taxa, in addition to *Paraphysomonas vestita* are first recorded on Ongul I.: *Chroococcus dispersus, Dichothrix orsiniana, Hydrocoryne spongiosa, Lyngbya aerugineo-coerulea, L. martensiana, L. semiplana, L. purpurea, Nodularia quadrata, Phormidium antarcticum, P. bohneri, P. fragile, P. frigidum, P. incrustatum, P. uncinatum, Schizothrix coriacea, Xenococcus schousboei, Ulothrix mucosa, Palmodictyon viride, Microspora stagnorum, Pleurococcus antarcticus* and *Sphaerocystis schroeteri* var. *nivalis.* (Auth. mod.)

B-37469

Ohtani, S., Kanda, H., **Epiphytic algae on the moss community of *Grimmia lawiana* around Syowa Station, Antarctica,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.255-264, 15 refs.

The epiphytic algae on the moss community of *Grimmia lawiana* at Showa Station were taxonomically and ecologically investigated. Nineteen species of blue-green algae, dominated by *Nostoc* sp., and *Stigonema minutum* were identified. A single diatom species was recognized. Of the 9 localities of moss colonies, Strandnibba and Sör Rondane Mountains are considered to be the most favorable habitats for epiphytic algae. The prominent algal flora on the moss colonies might be caused by the abundant water supply from the continental glacier during the summer season and by the rich nutrients from the excrement of resting sea birds. (Auth. mod.)

B-37470

Kanda, H., **New localities and taxonomic remarks for some mosses in continental Antarctica,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.265-272, 20 refs.

Distribution and taxonomic aspects of 4 moss species occurring in continental Antarctica are discussed. *Bryoerythrophyllum recurvirostre* (Hedw.) Chen and *Pottia heimii* (Hedw.) Hampe were found in several localities of Vestfold Hills. The former species was collected 30 years after it was first discovered at Vestfold Hills, and the latter was recorded in the same area for the first time. *Pottia austro-georgica* Card. was collected in Amundsen Bay, which is the second record in continental Antarctica. *Grimmia lawiana* J.H. Willis was collected on the Sör Rondane Mountains. Distribution maps and illustrations of these species are given. (Auth.)

B-37476

Hoberg, E.P., **Aspects of ecology and biogeography of acanthocephala in antarctic seabirds,** *Annales de parasitologie humaine et comparée,* 1986 61(2), p.199-214, Refs. p.211-214.

Four species of acanthocephalans are reported from seabirds, nototheniid fishes and gammaridean amphipods in the western Antarctic. *Corynosoma hamanni* (von Linstow, 1892) was found in *Phalacrocorax atriceps* King, *Chionis alba* (Gmelin), *Larus dominicanus* Lichtenstein, and *Catharacta lonnbergi* (Mathews). The complete life cycle of this acanthocephalan was elucidated. *Corynosoma shackletoni* Zdzitowiecki, 1978 was recorded only as a parasite of *P. papua.* The first known gravid females of this species were found during this study, indicating that *C. shackletoni* is a typical parasite of avian, rather than mammalian, final hosts. It is the first acanthocephalan known to typically occur in an avian definitive host in Antarctica. The host distribution of *Corynosoma* spp. in birds suggests that these parasites are being acquired from piscine or possibly amphipod prey, generally in nearshore situations. Seabirds representing the zooplanktovore feeding guild were not infected. The host and geographic distributions of *Corynosoma* in piscine, avian, and mammalian hosts suggests that oceanographic factors, particularly the Antarctic Convergence, could limit the ranges for some species of parasites. Host-parasite coevolution appears to have had an important influence on the species composition of the acanthocephalan fauna of seabirds and marine mammals in Antarctica. (Auth. mod.)

B-37477

Low, A.J., **Tree planting in the Falkland Islands,** *Forestry,* 1986 59(1), p.59-84, Refs. p.79-80.

Tree planting prospects were appraised during a visit to Falkland Is. in 1983. The creation of effective shelterbelts appeared feasible, using modern establishment techniques developed in upland Britain, correct species choice, careful site selection, adequate belt width, protection against damage, good technical supervision and patience. The most promising species are *Cupressus macrocarpa, Picea sitchensis* (Queen Charlotte Islands origin), *Pinus contorta* (coastal origins only), *Pinus radiata* and *Nothofagus betuloides.* Using the same species, limited planting for wood production may also be possible on a very few sheltered, moist, accessible sites. Small scale amenity and shelter planting for houses and gardens is clearly practicable. Imported planting stock will be necessary due to the impracticality of raising sizeable quantities in the Islands. (Auth. mod.)

B-37480

Matsumoto, G.I., Watanuki, K., Torii, T., **Total organic carbon in pond waters from the Labyrinth of southern Victoria Land in the Antarctic,** *Antarctic record,* Nov. 1987 31(3), p.171-185, 19 refs.

Total organic carbon (TOC) in 10 freshwater and saline ponds in the Labyrinth of southern Victoria Land was examined to clarify their distribution and sources. The TOC concentrations ranged from 0.78 to 23.1 mgCl/l. The high TOC concentrations were found only in saline pond waters. The correlation coefficient between electric conductivity and TOC value was quite high (0.82). This result can be explained as follows: organic substances supplied from snow and glacial meltwaters are first concentrated in the residual pond waters by freezing out. Also *in situ* photosynthetic activity produces organic substances, but certain unstable organic constituents may be degraded by microbial activity. Further, repeated freezing and evaporation of pond waters works to concentrate refractory organic substances and dissolved inorganic salts in the pond bottom waters, over a long period of time. (Auth.)

B-37487

Kamenev, V.M., **Avifauna of the Fildes Peninsula, King George Island, South Shetland Islands,** *Polar geography and geology,* July-Sep. 1987 11(3), p.202-209, For Russian original see B-37073. 7 refs.

The article represents a survey of the avifauna of the Fildes Peninsula, concentrating on the dates and length of the reproductive cycle and based on field observations during the 26th SAE in 1981-1982. Twelve species were nesting, while a further 6 species were recorded as visitors. In many species the length of the reproductive cycle is identical with that for birds from the Haswell Archipelago in East Antarctica; however, the start of egglaying, and hence of all other activities may be later by up to two weeks in the case of the Fildes Peninsula populations. Snow cover on the nesting sites appears to be a critical factor here. The overall control on dates and length of the breeding season in both areas is food availability. In terms of adaptation of the reproductive cycle to environmental conditions, the birds of King George I. are thus intermediate between antarctic and subantarctic avifaunas. (Auth.)

B-37498

Hamner, W.M., **Biomechanics of filter feeding in the antarctic krill *Euphausia superba:* review of past work and new observations,** *Crustacean biology,* May 1988 8(2), p.149-163, 25 refs.

Previous work is reviewed and new observations are presented on the morphology and mechanics of the thoracic endopodites and exopodites of *Euphausia superba.* Movements of the endopodites are rapid and stereotyped. As the feeding basket expands laterally a pressure gradient is created which sucks water and particles into the basket from the front. Water and particles never enter the basket from the sides, below, or behind. Once inside the feeding basket, particles are retained on the filter and water is squeezed out laterally between the setae. During expansion of thc basket the exopodites act as flapper valves which inhibit lateral entry of water, but during the compression stroke the exopodites lift for approximately 100 ms and permit expulsion of water. Comb setae loosen food particles trapped on the filter setae and the tips of the filter setae brush them to the mandibular palps. When phytoplankton is scarce, krill feed steadily with metronomic sweeps of the basket. When phytoplankton is abundant, they exhibit discontinuous feeding patterns. Filter feeding by compression pumping may occur in all those euphausiids that have thoracic appendages like those of *E. superba* and which filter feed on phytoplankton. (Auth. mod.)

B-37500

Hindell, M.A., Little, G.J., **Longevity, fertility and philopatry of two female southern elephant seals *(Mirounga leonina)* at Macquarie Island,** *Marine mammal science,* Apr. 1988 4(2), p.168-171, 12 refs.

Observation of 2 female seals, both branded in Nov. 1962 and repeatedly resighted until 1985 on Macquarie and Campbell islands, is reported. Both females were observed suckling pups within 1 km of where they were born 23 years earlier, reinforcing the notion that elephant seals at Macquarie I. are philopatric.

B-37505

Hector, J.A.L., Goldsmith, A.R., **Role of prolactin during incubation: comparative studies of three *Diomedea* albatrosses,** *General and comparative endocrinology,* Nov. 1985 60(2), p.236-243, 19 refs.

DLC QP187.G37

Prolactin was measured at various stages of the breeding cycle in 3 closely related albatrosses. Each species is monogamous, laying one egg, with the sexes sharing parental duties, including lengthy incubation shifts. In experiments where blood samples were taken daily throughout single incubation shifts (of both sexes) and every 3 hr for 36 hr, high prolactin levels were observed, but there was no indication of any changes that might suggest direct relationships between the hormone concentrations and incubatory behavior. However, high prolactin levels were characteristic of the whole incubation period with a significant decline in concentrations towards the end of the brood-guard period. These results suggest that the incubation period is not endogenously timed but that prolactin may still affect the overall duration of incubation shifts. (Auth.)

See also:
A-34871 A-35145 A-36536 A-36550 A-37196 D-34755 D-36984 D-37503 E-34679 E-34803 E-34805 E-34806 E-34807 E-34924 E-34925 E-35008 E-35060 E-35076 E-35095 E-35110 E-35156 E-35157 E-35158 E-35180 E-35231 E-35250 E-35258 E-35261 E-35335 E-35339 E-35340 E-35342 E-35465 E-35624 E-35803 E-35805 E-35806 E-35809 E-35810 E-35811 E-35893 E-35895 E-36020 E-36124 E-36126 E-36176 E-36249 E-36252 E-36260 E-36383 E-36556 E-36679 E-36699 E-36722 E-36774 E-36780 E-36796 E-36840 E-36869 E-36952 E-36953 E-36954 E-36955 E-36962 E-37036 E-37037 E-37068 E-37210 E-37347 E-37348 E-37501 F-34919 F-35249 F-35629 F-35934 F-36589 F-36966 F-36977 F-36978 G-35091 G-35745 G-36491 H-35009 H-36235 I-35586 I-36739 I-37384 J-34706 J-35112 J-35220 J-35451 J-35452 J-35625 J-35658 J-35700 J-35750 J-35751 J-35757 J-35923 J-35924 J-35925 J-35926 J-36318 J-36362 J-36366 J-36575 J-36785 J-36867 J-37172 J-37345 J-37454 M-35116 M-36142 M-36143 M-36144 M-37105 M-37290

C. CARTOGRAPHY

C-34739
Shibuya, K., Ito, K., **Satellite Doppler stations in the Japanese antarctic research region, 1. Around Showa Station,** *Japanese Antarctic Research Expedition. JARE data reports,* Sep. 1986 No.119, p.87-118, 4 refs.

The two-wave NNSS receiver was utilized for the first time in 1979 by JARE-20 during the oversnow vehicle operation of the Yamato-Belgica traverse survey. Between 1979 and 1985 more than 400 satellite Doppler stations were installed around Showa Station, Mizuho Plateau and the Sör Rondane Mountains. Except for geodetic control surveys in outcrop areas, coordinates of the satellite Doppler stations in the ice sheet change with time through ice sheet flow and ablation/accumulation of snow. Stations may be lost or resurveyed with the same station name in a few years time. It is thus necessary to keep the record of the data summary in order to avoid later confusion. The data log format is outlined. (Auth. mod.)

C-34769
Shibuya, K., Kajikawa, Y., Segawa, J., **Surface configuration of the antarctic ice sheet in the sector 30 deg E-80 deg E using SEASAT altimetry data,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.1-12, 19 refs.

Using Interim Geophysical Data Record (IGDR) of SEASAT radar altimetry, a configuration map of the Antarcitc ice sheet in the area bounded by 30 deg and 80 deg E and latitude 72 deg S is compiled. 7480 footprint data of every second sampling (6.62 km apart) along 63 subsatellite groundtracks are obtained in the area. The resulting configuration resembles the map published by the Scott Polar Research Institute in 1983. 157 ground survey data points from a triangulation survey, satellite Doppler positioning and a previously published topographic map are used to estimate an overall accuracy of the map. The ground survey height is on an average 2.2 m lower than the SEASAT-derived elevation with a standard deviation of 21.5 m, which may reflect the limited data quality of IGDR without retracking correction of the return-pulse waveform. Drawing orthogonals to the contours, ice drainage basins are determined and they are slightly different from the previous ones defined by the oversnow traverse surveys. (Auth.)

C-34910
Jolly, D.C., **Was Antarctica mapped by the ancients,** *Skeptical inquirer,* Fall 1986 11(1), p.32-43, Numerous refs.

An examination is made of historical sources as propounded by two cartographer/historians and they are found wanting in concluding that Antarctic did indeed appear properly on some of the older charts. Their explanations are overly complex, their assumptions too pat, their objectivity too suspect, and their faith too strong for the wrong map makers.

C-35216
Bondina, T.V., Nazirov, M., Nikitin, P.A., Spiridonov, IU.G., **Methods of compiling general radar maps of polar regions** [Sposob sostavleniia obzornykh radiolokatsionnykh kart poliarnykh oblasteĭ Zemli], *Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy,* 1986 Vol.25, p.58-63, In Russian.

A photomontage method of preparing maps based on spaceborne radar data is described. The method is illustrated by two polar maps, one for the Arctic and one for the Antarctic.

C-35300
Argentina. Dirección Nacional del Antártico, **Argentine encyclopedic antarctic atlas** [Atlas enciclopédico Antartico Argentino], Buenos Aires, Ministerio de Defensa, Dirección Nacional del Antártico, 1984, 142p.
DLC G3102.A55 A7

This collection of maps, and accompanying text, emphasizes the antarctic triangle which begins south of latitude 60S, ends at the South Pole, and is enclosed between longitudes 25 and 74W, which Argentina claims as its own. Not only the geographic aspects are considered, but the political, historic and economic as well. In this light, the antarctic climate, its flora and fauna, resources etc., are reviewed, with particular attention to the Argentine involvement in the Antarctic, illustrated by detailed mapping and description of, among others, the foundation, location, access, installations and activities of its stations and bases in the area.

C-35306
U.S. National Foreign Assessment Center, **Atlas of the polar regions,** Boston, Jones and Bartlett, 1985, 66p.
DLC G1054.N3

This is a hardcover edition of an atlas originally published in 1981. In addition to numerous maps, the atlas contains illustrations and descriptions covering, both in the Arctic and the Antarctic, the following areas of interest: the geopolitical issues—including sovereignty problems, the Antarctic Treaty, the past and potential exploitation of marine and mineral resources—history, climate, continental and sea ice conditions, discovery and exploration, the science programs, the stations, transportation, and the environmental protection measures. Two foldouts, the Arctic reference map and the Antarctic reference map, respectively, are appended.

C-35566
Craddock, C., **Circum-Pacific Map Project,** *Antarctic journal of the United States,* 1985 20(5), p.255.

The CPMP has the participation of scientists from 35 Pacific nations and is organized into five panels representing the four quadrants of the Pacific Ocean and the antarctic region. Completed or nearly completed antarctic maps at a scale of 1:10,000,000 include: Base Map and Geographic Map (both 1978); Antarctica-Plate Tectonics Map (1981, revised 1983); revised Base Map; Antarctica Geodynamic Map (1985); Antarctica Geologic Map. Others are in preparation.

C-35567
Southard, R.B., **Mapping activities in Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.256.

Aerial photography dominated the 1984-1985 field season effort for mapping Antarctica. The LC-130 aircraft outfitted for aerial photography flew approximately 77 hours dedicated to the acquisition of photographs in support of various scientific projects. These projects included studies of Beardmore Glacier, Siple Coast and Crary Ice Rise, polynyas at Terra Nova Bay and Cape Washington, IR data of Mount Erebus, and published maps of Hut Point Peninsula, McMurdo Station, and Amundsen-Scott Station.

C-35568
Lucchitta, B.K., Edwards, K., Eliason, E.M., Bowell, J., **Landsat multispectral images of Antarctica applied to mapping and glaciology,** *Antarctic journal of the United States,* 1985 20(5), p.256-259, 9 refs.

The U.S. Geological Survey is conducting a program to provide digitally enhanced, multispectral (MSS) Landsat images of Antarctica. The goal is to furnish accurate planimetric, false-color composite-image maps in polar stereographic projection for these purposes: (1) to locate and delineate blue-ice areas for the collection of meteorites; (2) to produce special-purpose maps showing selected features only; (3) to provide synoptic views that aid in the detection and interpretation of glaciological features associated with ice sheets, outlet glaciers, ice streams, and ice shelves; (4) to monitor changes in coastlines and glacial features; (5) to enable the superposition and correlation of different types of digital cartographic data; and (6) to furnish spectral and/or structural information in areas of limited bedrock outcrop to aid in regional geologic interpretation. Details of progress in the first four objectives are presented.

C-35569
Southworth, C.S., **Use of Landsat data to map bedrock and surficial geology of the ice-free valleys of southern Victoria Land,** *Antarctic journal of the United States,* 1985 20(5), p.259-260, 7 refs.

Landsat multispectral scanner (MSS) image data and laboratory spectra of field samples were used to differentiate among lithologic units. The absence of vegetation, the clean atmosphere, and the physically weathered bedrock provide a good area for using spectral discrimination of geologic materials to facilitate geologic mapping. The high values displayed by the MSS band 7/band 4 ratio for sandstone, granite, and felsic igneous rock make this a good ratio to discriminate these from other rocks. The MSS band 7/band 6 ratio proved optimum for distinguishing dolerite. Reflectance spectra were obtained fo sandstone, granite, and dolerite samples by using a Beckman UV5240 spectrophotometer. Ratio values of reflectance spectra correlate with the DN band ratio selection. A linear stretch of MSS band 7 was used to enhance the contrast in reflectance between mafic and felsic rocks at these NIR wavelengths. A hybrid color composite was produced by using the MSS band 7/band 4 ratio, the MSS band 7/band 6 ratio, and the stretched MSS band 7. Outcrops of Beacon sandstone, Vida granite, Ferrar dolerite, Asgard metasediments, and felsic igneous rocks could be distinguished. Mafic to intermediate differentiated rock in a Ferrar dolerite sill, stratigraphic variations in the Beacon Sandstone Supergroup, and the contact of felsic igneous intrusives into gneiss basement were visually delineated.

C-35632
Reshetov, E.A., Savel'ev, B.I., **Contemporary methods in antarctic cartography** [Sovremennye metody kartografirovaniia Antarktidy], *Geodeziia i kartografiia,* 1986 No.1, p.23-25, In Russian. 6 refs.

An evaluation is given of traditional as well as new aerial photography methods and instrumentation used in antarctic cartography. The maps are also discussed with regard to their scale, accuracy, type of projection and methods of indicating geographical and topographical features, including ice volume, flow rate and surface elevations. Ways in which satellite photography can be used in the Antarctic, and programs designed to exploit these capabilities, are examined.

C-35850
Egan, W.G., **Airborne observations of polarization and photometry of terrestrial surfaces,** International Symposium on Remote Sensing of Environment, 19th, Ann Arbor, MI, Oct. 21-25, 1985. Proceedings, Vol.1, Ann Arbor, Environmental Research Institute of Michigan, [1986], p.501-510, 11 refs.

As a prelude to the possible operational use of polarization in passive satellite remote sensing of terrestrial surfaces, polarimetric and photometric observations were made from an airborne platform over various relatively uniform ice, ocean, snow and terrestrial surfaces on the margin of the Antarctic continent. Sensor wavelengths were 0.36, 0.400, 0.500 and 1.0 micron. Comparisons of the airborne (helicopter) observations with ground based observations revealed that a set of characteristic remotely sensed polarimetric and photometric signatures can be determined for each representative terrestrial surface, which can be affected by the scale of the viewing area, its surface structure, slope and the intervening atmosphere.

C-35889
Acuña, J.E., Subiza, W.H., Melconián, J.A., **Topographic survey of the South Shetland Islands** [Relevamientos topográficos efectuados en las islas "Shetland del Sur"], *Montevideo. Instituto Antártico Uruguayo. Actividad científica, 1985/86,* Mar. 20, 1987 Vol.1, p.20-24, In Spanish with English summary.

During the austral summer of 1986, the Military Geographic Survey performed two topographic surveys of King George and Nelson islands, in order to provide support for scientific studies and to attend logistical needs of the Artigas Station. The system employed, the relative accuracy obtained, and the cartographic document currently in process are briefly described. (Auth. mod.)

C-36068
Bentley, C.R., **Remote sensing of the Ross Ice Streams and adjacent Ross Ice Shelf, Antarctica,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.20-29, 35 refs.

In the first few seasons of the Antarctic Siple Coast project, the University of Wisconsin has concentrated on radar and seismic studies. Highlights of the results to date include the delineation of ice streams A, B, and C and the ridges in between, determination of the surface elevations over the area, discovery of a much more advanced grounding line than previously recognized and recognition of a broad, flat, barely grounded "ice plain" just inside the grounding line. Complex zones between and adjoining some of the ice streams, characterized by an interspersal of undisturbed ice and crevassed patches, give the impression of being transformed from sheet flow into stream flow in a process of ice stream expansion. An indicated negative mass balance for ice stream B could be the result of this "activation" process. Ice stream C, currently stagnant, exhibits terraces and reversals of surface slope, associated with zones of strong, steady basal radar reflections. These features suggest that subglacial water has been trapped by reversals in the hydraulic pressure gradient. (Auth. mod.)

C-36070
Cudlip, W., McIntyre, N.F., **Seasat altimeter observations of an antarctic "lake",** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.55-59, 16 refs.

This paper reports an analysis of Seasat altimeter observations of an extremely flat area on the surface of the East Antarctic ice sheet, approximately 30 km in extent, centered at 68.6 S 136.0 E and close to the edge of the sub-glacial Astrolabe Basin. It has a regional slope

of between zero and 0.01 deg and non-random variations in height along track of about 1 m on the scale of a few km. The average radar backscatter coefficient is 5 dB in the region of of the Astrolabe Basin, compared to a more usual value of about 10 dB for other areas of the ice sheet. A computer enhanced Landsat image of the region clearly shows the rougher steeper terrain to the North, with the surface in and around the flat area appearing totally smooth and featureless. NSF/SPRI/TUD radio echo-sounding data from the region, although limited in extent, shows a relatively strong signal (indicative of ice at the pressure melting point) over a large region. The signal under the flat area, however, is particularly strong and smooth, confirming the association between the surface feature and a bedrock lake 3800 m below. (Auth.)

C-36077

Partington, K.C., Cudlip, W., McIntyre, N.F., King-Hele, S., **Mapping of Amery Ice Shelf, Antarctica, surface features by satellite altimetry,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.183-188, 31 refs.

Subtle changes are identified in altimeter wave forms associated with crevassed zones and the grounding line. Normal retracking procedures are shown to be inadequate in detecting such changes, and so methods which provide sensitive indication of the presence of these features in the sampled areas are devised. By ranging to the first return in the echo, the grounding line is identified, and by differencing this measurement with the half-peak power range, a measure of surface roughness is obtained which can be used to detect crevassed zones. Detection of crevassed shear zones allows delimitation of distinct zones of flow in the ice shelf which can be monitored by future altimeter missions. Monitoring of the grounding-line position can provide sensitive indication of mass-balance conditions over the grounded part of the drainage basin. (Auth.)

C-36080

Zwally, H.J., Stephenson, S.N., Bindschadler, R.A., Thomas, R.H., **Antarctic ice-shelf boundaries and elevations from satellite radar altimetry,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.229-235, 14 refs.

As part of a systematic analysis of Seasat radar altimetry data to measure antarctic ice fronts and ice-shelf elevations north of lat. 72S, Fimbulisen (between long. 12W and 08E) and the Amery Ice Shelf (around long. 72E) are mapped. Interactive computer analysis is used to examine and correct the altimetry range measurements and derive the ice-front positions. Surface elevations and ice-front positions from radar altimetry are compared with ice fronts, ice rises, crevasse zones, and grounding lines identified in Landsat imagery. By comparison of the visible features in imagery and the computer-contoured elevations from radar altimetry, the radar-elevation mapping on some ice rises is confirmed, but some spurious contours are also identified. During the interval between the 1974 Landsat imagery and the 1978 radar altimetry, the central part of the Amery Ice shelf front advanced 1.5 km/a, which is in agreement with previous ice-velocity measurements, suggesting negligible calving in the central part of the ice shelf. The undulating surface and small mean slope from the grounding line to about lat. 70S suggest a zone of partial grounding similar to Rutford Ice Stream. On Fimbulisen, some previously unmapped ice rises are identified. (Auth. mod.)

C-36092

Chase, T.E., Seekins, B.A., Young, J.D., Eittreim, S.L., **Marine topography of offshore Antarctica,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.147 + maps, 2 refs.

DLC QE350.A567 1987

Two maps of the offshore topography off Wilkes Land, are presented here with the seafloor contours on both polar stereographic and Mercator projections to give the reader an option of either for future investigations. These maps are the result of previous surveys in this region upgraded by data collected on the U.S. Geological Survey ship *S.P. Lee* on cruise L1-84-AA. Perhaps the most striking features revealed are the dendritic, deeply cut canyon systems of the upper continental rise. While these canyons begin at various upper levels on the rise, their deeply incised portions end at about 3500 m. The shelf-slope break ranges from 400 to 600 m depth. At midlevel on the upper continental rise (about 2500 m) isolated highs occur. (Auth. mod.)

C-36184

Lucchitta, B.K., **Multispectral Landsat images of Antarctica,** *U.S. Geological Survey. Bulletin,* 1987 No.1696, 21p., Refs. p.20-21.

DLC QE75.B9

The U.S. Geological Survey has initiated a program to map Antarctica by using colored, digitally enhanced Landsat multispectral scanner (MSS) images to increase existing map coverage and to improve upon previously published Landsat maps. A mosaic image in map projection of the McMurdo Sound region was compiled. This digitally enhanced mosaic covers 4 complete and 2 partial 1:250,000-scale topographic quadrangles and shows significantly more detail in rock and ice than do previously compiled black-and-white paperprint mosaics of the region. Digitally processed Landsat images can provide accurate and detailed base maps, and they may aid in solving several antarctic research problems. Some of these problems are addressed in the mapping program; results are given in this report. The images also reveal that the Byrd Glacier has moved at an average velocity of 800 m/yr within 10 years. It is found that the resolution of Landsat MSS (about 80 m) is insufficient for most detailed spectral studies because almost all rock outcrops in Antarctica are small, but it is anticipated that the resolution of thematic mapper (TM) images (about 30 m) will be adequate for such studies in the future. (Auth. mod.)

C-36326

Laxon, S.W., Rapley, C.G., **Satellite altimeter measurements of the geoid in sea ice zones,** *Advances in space research,* 1986 6(9), p.99-102, 11 refs.

The Seasat radar altimeter provided surface height measurements to a precision better than 10 cm over the open ocean. The data have been uscd to produce maps of the ocean geoid which reveal details of sub-surface topography such as sea mounts, ocean trenches and mid-ocean ridges. In areas of the ocean covered by sea ice, however, the quasi-specular ice returns which occurred were incorrectly handled by the on-board processor. This resulted in a significant decrease in the precision of the surface height estimates. Consequently, researchers have generally eliminated data from regions where sea ice is suspected to have been present, including large areas of the antarctic ocean. A technique is described for significantly improving the height measurements over such areas permitting the mapping of the geoid in these regions. (Auth. mod.)

C-36486

Krasiuk, V.S., Nazirov, M., Nikitin, P.A., Bukhman, E.V., **Express analysis of satellite radar images of sea ice,** *Soviet meteorology and hydrology,* 1987 No.2, p.59-63, Translated from Meteorologiia i gidrologiia. 5 refs.

Methods and possibilities of digital processing of operationally incoming satellite data are discussed using the radar images of drift ice in the Ross Sea, obtained from the Kosmos-1500 satellite. The application of interactive processing methods for express analysis increases reliability and decreases ambiguity.

C-36810

Allison, I., Young, N.W., **Benefits of a receiving station in AAT to Australia's antarctic glaciological research,** *Australia. Commonwealth Scientific and Industrial Research Organization. Office of Space Science and Applications. COSSA publication,* Jan. 1987 No.010, p.48-56, 18 refs.

In support of benefits to be gained from establishing the satellite data receiving station, the huge size (more than 4 million sq km) of the area to be surveyed is pointed out. Other countries are experiencing success and acquiring considerable knowledge of other areas under glaciological surveillance. To go forward with glaciological research in AAT requires the use of the data remotely sensed by satellite-borne equipment and the amount of data generated in this manner requires a direct readout and processing capability in Antarctica. The types of data expected, methods of obtaining data, and the types of satellites carrying the sensors are discussed.

C-36924

LeBrecque, J.L., **USAC aerosurvey: accelerating exploration of the Antarctic,** Lamont-Doherty Geological Observatory of Columbia University. [Yearbook], [Palisades, NY,] 1987, p.52-59, 3 refs.

A joint survey of the Antarctic Peninsula and its surrounding basins by the U.S., Argentina, and Chile has operated during the austral summers of 1986 and 1987. The survey intends to gather sufficient data over the region to provide detailed mapping of magnetic and gravity anomalies and from these to derive the structure, age, and evolutionary history of the region. Some details are provided of the progress thus far achieved for the Weddell and Scotia basins and the Bellingshausen margin.

C-36974

Tanzi, H.J., **Antarctic continent and Tierra del Fuego in the 16th century** [El continente antártico y la Tierra del Fuego en el siglo XVI], *Revista de historia de America,* July-Dec. 1985 No.100, p.13-54, In Spanish. 63 refs.

16th century cartographers, and cartographic documents based on Spanish and Portuguese exploration of the southern ocean in that period, are reviewed. The antarctic continent and South America, separated by a strait, are shown on illustrations of Schöner's globe of 1515. A 1533 map of Schöner's hemisphere stretches the austral continent around the antarctic polar circle. The origins of the name "Tierra del Fuego", its appearance on ancient maps as part of Antarctica, and the erroneous geographic concepts of the period, as well as some extraordinary geomorphological guesses—proven to be correct a century after they were ventured—are discussed.

C-37148

Nazirov, M., Nikitin, P.A., **Macro and meso-structures on the surface of the antarctic ice sheet from satellite radar images** [Makro- i mezostruktury poverkhnosti Antarkticheskogo lednikovogo pokrova po sputnikovym radiolokatsionnym izobrazheniiam], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* May 1987 No.60, p.76-84, In Russian with English summary. 26 refs.

Comparison of spaceborne radar images, obtained with the "Cosmos-1500" satellite, with traditional initial data, revealed a total agreement of catabatic wind flow lines in eastern Antarctica. Possible mechanism of the formation of eolian mesostructures in snow cover are analyzed and the identification of six ice domes, based on the nature of radio signal scattering by the ice sheet (in the sector 2-26 deg E.Long.) are discussed.

See also:
B-37252 E-34732 E-34898 E-35211 E-36265 F-35748 F-35849 F-35920 F-36008 F-36074 F-36443 F-36477 F-36721 F-36794 F-36940 F-37272 G-36809 G-37026 G-37046 J-36356 L-34771 M-36570

D. EXPEDITIONS

D-34714
Sovetskaia antarkticheskaia ekspeditsiia, Korotkevich, E.S., ed, **Twenty-fourth Soviet Antarctic Expedition. General description of studies of the 1978/79 season, with research results** [Dvadtsat' chetvertaia sovetskaia antarkticheskaia ekspeditsiia. Sezonnye issledovaniia 1978/79g. Obshchee opisanie i nauchnye rezul'taty], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.78, 139p., In Russian. Refs. passim. For individual papers see 41-1266 through 41-1270 or B-34720, F-34716, 34718-34719, G-34717, and J-34715.

This report on the 1978-79 Soviet Antarctic Expedition provides, in pt. 1, three chapters which cover organization and conduct of the expedition, ship observations, and a summary of research and other activities at Soviet stations and by teams on traverse operations, respectively. Pt. 2 consists of 6 individual papers giving the scientific results of various projects.

D-34736
Gatehouse, M., **Lawyer in a cold climate: Project Blizzard 1985/86,** *Law Institute journal,* July 1986 60(7), p.698-699.

The article describes the experiences of an Australian lawyer as a member of the 7-person 1985-1986 Project Blizzard expedition, dedicated to the investigation, restoration and conservation of Sir Douglas Mawson's main hut at Cape Denison, the site of his 1911-1914 Australian Antarctic Expedition.

D-34755
Fütterer, D., ed, **Expedition Antarktis-IV with FS *Polarstern* 1985/86. Trip report** [Die Expedition Antarktis-IV mit Fs *Polarstern* 1985/86. Bericht von den Fahrtabschnitten], *Berichte zur Polarforschung,* 1986 No.32, 114p., In German and English.

In this report are described the route, scientific work, and preliminary data for Legs 1a through 1c and 2 of the 4th German Antarctic Expedition with FS *Polarstern.* Legs ANT-IV/1a-1c were given over to diverse regional and gravity surveys. On the first antarctic leg, Rio to Punta Arenas, modest gravity and geochemical-sedimentological investigations on early diagenesis in the sediment and particle flow were carried out in the water column of Bransfield Strait.

D-35006
Pratt, P., **Swan of the Antarctic,** *Shell world,* Oct./Nov. 1986 5(11), p.24-29.

This brief account contrasts the journey Scott and his party made to the South Pole in 1911-1912, with the traverse made in 1984-86 by Swan, Mear, and Wood, following Scott's route. The major difference was in technological improvements developed during the intervening 70 years, and they made all the difference. The expedition ship, *Southern Quest,* coming to retrieve the expeditioners, was crushed and sank in the Ross Sea.

D-35233
Hattersley-Smith, G., **Some Canadians in the Antarctic,** *Arctic,* Dec. 1986 39(4), p.368-369.

A list is provided of names and activities of Canadian scientists and explorers who have participated in various expeditions to Antarctica from 1898 to the present. The one Canadian expedition, taking place during the cruise of CGS *Hudson* from the Bedford Institute of Oceanography in 1969-1970, is also briefly described.

D-35327
Damaske, D., Roland, N.W., **Aeromagnetic survey over Antarctica: new findings on the geological-tectonic evolution of northern Victoria Land and the Ross Sea, during GANOVEX IV** [Aeromagnetische Messungen über der Antarktis: neue Erkenntnisse über die geologisch-tektonische Entwicklung von Nordviktorialand und Rossmeer durch GANOVEX IV], *Geowissenschaften in unserer Zeit,* 1987 5(1), p.1-9, In German. 7 refs.

The geological and geophysical research projects and activities of GANOVEX IV in northern Victoria Land are reviewed. Discussed are some of the questions which arose during the Expedition; surveying methods and instruments; the accomplishments of the aerial surveying program, the aircraft used, instrumentation available, and navigation procedures; and preliminary interpretation of the data gathered in the Transantarctic Mountains and over the Ross Sea.

D-35345
Foster, T.D., **Wilkes Land Expedition 1985,** *Antarctic journal of the United States,* 1985 20(5), p.103, 1 ref.

The Wilkes Land Expedition 1985 sought to study an almost unexplored region off Wilkes Land between 147 and 162 deg E. It is thought that this region may be the source of deep water which may be an important contribution to the abyssal waters of the world ocean. 86 hydrographic stations were occupied in the region; in addition, two test stations were occupied proceeding into the area, and five hydrographic stations were attempted on the transit to New Zealand.

D-35743
Fukunishi, H., **Activities of the wintering party of the 26th Japanese Antarctic Research Expedition in 1985-1986,** *Antarctic record,* Mar. 1987 31(1), p.11-37, In Japanese with English summary. 1 ref.

The wintering party of the 26th Japanese Antarctic Research Expedition, composed of 35 personnel, carried out routine observations and research activities at Showa and Mizuho stations, along the coast of Lützow-Holm Bay and in the dome area of Queen Maud Land from Jan. 1985 to Jan. 1986. The main research activity was a coordinated observation of the polar middle atmosphere, which was performed as part of the International Middle Atmosphere Program (MAP) In addition, survey trips for environmental research were carried out at short intervals along the coast. Glaciological and meteorological studies were carried out, as part of the International Antarctic Glaciological Project (IAGP), at Mizuho Station, Advanced Camp, Dome Camp, and on the traverse routes. (Auth. mod.)

D-35772
Furse, C., **Joint Services Expedition to Brabant Island, Antarctica, 1984/85,** *Geographical journal,* Mar. 1987 153(1), p.1-10.

Brabant I., lying off the west coast of the Antarctic Peninsula at 64 S, had only been visited on six very brief occasions since its discovery in 1898, although a 1/200,000 topographic map had been produced in 1963 from FIDASE aerial photography. This Joint Services

Expedition explored the island in three phases over a 15-month period from Jan. 1984 to Mar. 1985, travelling by boat and canoe as well as overland. A total of 35 men took part. Each phase was landed and recovered by HMS *Endurance*. The aims of the expedition were primarily scientific and secondarily adventurous. This paper briefly describes the expedition. Notes describe the *modus operandi,* which included the first complete winter in tents in Antarctica and the first long canoeing journeys there. Outlines of preliminary results are given for the two major research projects (on geology and human physiology) and other scientific programs. (Auth.)

D-35883

Jin, T., **Snow blizzard in summertime—random notes on observations in Antarctica** [Baofengxue de xiatian—Nanji kaocha sanji], Beijing, Guangming Daily Press, 1986, 216p., In Chinese.

This book contains a somewhat rambling, but comprehensive, account of the experiences of the Chinese research group which visited Antarctica in 1984/85. The group consisted of 591 members who left Shanghai in mid-Nov. 1984 on two ships, the *Xiangyanghong No.10* and the *J121*. Numerous photographic illustrations show activities of the members of the group and of the scenery and living conditions of Antarctica. An account is given of a big storm experienced on the Bellingshausen Sea (Chap. 15). Chap. 11 describes a big snow blizzard at the great Wall Station on King George Island. The group returned to Shanghai on Apr. 10, 1985, after a voyage of 142 days, covering 48,995 km.

D-35897

Stroud, M., **Scott: 75 years on,** *British medical journal,* Dec. 20-27, 1986 293(6562), p.1652-1653.

On the occasion of the 75th anniversary of Robert Scott's expedition to the South Pole, comments are made on Scott's planning and character by the doctor on the 3-man team that recently repeated Scott's route. The nutritional and logistics aspects of the 1911-1912 expedition are discussed, and the conclusion is reached that sheer starvation, with consequent emaciation, might have been the most important factor in the explorers' death.

D-35931

Maksutov, D.D., **Seasonal activity and scientific observations in the 27th Soviet Antarctic Expedition** [Sezonnye raboty y nauchnye issledovaniia v 27 Sovetskoĭ antarkticheskoĭ ekspeditsii], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.5-9, In Russian.

A general description of the scientific investigations of the 27th Soviet Antarctic Expedition for the 1981-1982 season, conducted on various ships as well as at Soviet antarctic stations, in the interior of the continent and on antarctic coasts. Research included crustal studies, gravimetry, geodesy, and some work in geomagnetism and oceanography.

D-35947

Bagriantsev, N.V., **POLEX South Expedition, 1984** [Ekspeditsiia "POLEKS-IUG-84"], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.88-90, In Russian.

Presented are details of the POLEX South Expedition, carried out on board the *Professor Vize* from Nov. 16, 1983, to May 15, 1984, including the ship's itinerary and the research program objectives. These were, mainly, to investigate the hydrophysical field structure of the Weddell subpolar cyclonic rotation system and its interrelationship with the Antarctic Circumpolar Current.

D-36084

Eittreim, S.L., ed, Hampton, M.A., ed, **Antarctic continental margin: geology and geophysics of offshore Wilkes Land,** Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, 1987, 221p., For individual papers see C-36092, E-36085, E-36087, E-36088, E-36093 through E-36098, L-36086, and L-36089 through L-36091.

DLC QE350.A567 1987

The Earth Science Series of the Circum-Pacific Council for Energy and Mineral Resources (CPCEMR) is designed to convey the results of geologic research in and around the Pacific Basin. This volume reports the results for Leg 1 of the 1984 U.S. Geological Survey (USGS) marine investigation across the Wilkes Land segment of the antarctic continental margin. The results for Leg 2 (Ross Sea) are given in a companion volume of the Earth Science Series. Geophysical and geological data were collected aboard the USGS research *S.P. Lee* during the USGS Operation Deep Sweep, which included other nations of Tonga, Fijii, Vanuatu, the Solomon Islands, and Papua, New Guinea.

D-36194

Sovetskaia antarkticheskaia ekspeditsiia, Artem'ev, A.N., ed, Dubrovin, L.I., ed, **Twenty-fourth Soviet Antarctic Expedition. General description of studies of the 1978-1980 winter seasons, with research results** [Dvadtsat' chetvertaia sovetskaia antarkticheskaia ekspeditsiia. Zimovochnye issledovaniia 1978-1980 gg. Obshchee opisanie i nauchnye rezul'taty], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.81, 112p., In Russian. Refs. passim. For individual papers see 42-115 and 42-116 or F-36200, H-36201, I-36195 through I-36197, K-36198 and K-36199.

This report on the 1978-1980 Soviet Antarctic Expedition provides, in pt.1, three chapters which describe the main activities, including the organization and the scientific observations, of the expedition. Pt.2 consists of 7 individual papers giving the scientific results of various projects.

D-36228

Sovetskaia antarkticheskaia ekspeditsiia, Serdiukov, V.I., ed, Botnikov, V.N., ed, **Twenty-third Soviet Antarctic Expedition. Seasonal studies, 1977-1978** [Dvadtsat' tret'ia sovetskaia antarkticheskaia ekspeditsiia. Sezonnye issledovaniia 1977/78 g], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.80, 171p., In Russian. Refs. passim. For individual papers see 42-240 through 42-243 or A-36235, B-36236, F-36229, F-36231 through F-36233, I-36234 and J-36230.

This report on the 1977-1978 Soviet Antarctic Expedition provides, in Pt.1, three chapters which describe the main activities, including the organization and the scientific observations, of the expedition. Pt.2 consists of 8 individual papers giving the scientific results of various projects.

D-36462

Studenetskiĭ, A.S., **Marine hydrological research of the first Russian antarctic expedition, 1819-1821** [Morskie gidrologicheskie issledovaniia pervoĭ russkoĭ antarkticheskoĭ expeditsii 1819-1821 gg.], *Geograficheskoe obshchestvo SSSR. Izvestiia,* Sep.-Oct. 1987 119(5), p.453-455, In Russian. 1 ref.

The 1819-1821 Russian Antarctic Expedition, under the leadership of F.F. Bellingshausen and M.P. Lazarev, is quoted as one of the first seafaring research expeditions in history, particularly in the southern ocean. Some oceanographic data collected by the two

ships, *Vostok* and *Mirnyy,* during that expedition, and their contribution to extant principles governing marine research, are briefly discussed.

D-36463

Koshechkin, B.I., **Attraction of the poles** [Pritiazhenie poliusov], Leningrad, Lenizdat, 1987, 184p., In Russian.

This biography opens with a description of the early experiences of the Soviet scientist and explorer A.F. Treshnikov which led to his life-long interest in both polar regions. Details of many expeditions to the Arctic and to Antarctica are presented in subsequent chapters in chronological order, outlining a profile of the man himself by revealing the thoughts and feelings driving him in his pioneering activities.

D-36475

Ponomareva, L.A., **In Scotia Sea** [V more Skotiia], *Zemlia i vselennaia,* May-June 1987 No.3, p.65-71, In Russian.

The 1985 cruise of the research vessel *Akademik Kurchatov* leaving Kaliningrad on Nov. 1, 1985, bound for Arctowski Station, is described. The research area covered a 360-sq-mile polygon in the vicinity of South Shetland Is. Polish and Soviet investigators studied the hydrological and geological structure of the region, plankton vertical distribution and, mainly, the spatial distribution of krill. Life and facilities on Arctowski Station are briefly described.

D-36740

India. Department of Ocean Development, **Scientific report of the Third Indian Expedition to Antarctica,** Trivandrum, Centre for Earth Science Studies, 1986, 266p., For individual papers see B-36745 through B-36753, E-36754 through E-36757, F-36759, G-36741, G-36761, G-36762, I-36742, I-36743, I-36760, K-36744 and L-36758.

The Third Indian Scientific Expedition to Antarctica succeeded in establishing India's permanent station Dakshin Gangotri in a record time of one antarctic summer, about 60 days. After completing the work, a team of 12 members was left behind at the station for wintering in Antarctica during 1984. The rest of the summer team returned in Mar. 1984. This report provides details of the establishment of the Indian antarctic station and the research work carried out in the fields of meteorology, biology, geology and geophysics, communication and radiophysics and environmental sciences.

D-36808

Burman, J., **Shipwreck: courage and endurance in the southern seas,** Cape Town, Human and Rousseau, 1986, 140p., Refs. p.133-135.

DLC G525.B8755 1986

In the last chapter of this book, a detailed description is given of the hardships endured by Shackleton and his party in an aborted attempt to cross the antarctic continent. The expedition left England on board the *Endurance* on Aug. 8, 1914; the ship was lost to the pack ice in Bransfield Strait in Oct. the following year; the men, left with three small boats, reached Elephant I. on Apr. 16, 1916, where the party split, Shackleton and 4 men leaving in one boat to seek help if they could reach South Georgia, the remainder staying behind. The courage, resourcefulness and perseverance showed by Shackleton throughout the trying experience, which culminated in his rescuing all of his men from their predicament on Aug. 30, 1916, is acknowledged.

D-36984

Schnack-Schiel, S., ed, **Winter expedition of FS *Polarstern* to the Antarctic (ANT V/1-3)** [Die Winter-Expedition mit FS *Polarstern* in die Antarktis (ANT V/1-3)], *Berichte zur Polarforschung,* 1987 No.39, 259p., In German and English with English and/or German summaries.

For the first time RV *Polarstern* spent the winter in the pack-ice zone of the Antarctic starting on May 6 and ending on Dec. 14, 1986. The cruise consisted of 3 legs (V/1, 2, 3) on which different multidisciplinary research programs were carried out. The first leg concentrated on 3 objectives in the Bransfield Strait region: studies on the distribution and composition of krill; fisheries research around Elephant I. to estimate biomass as well as to examine biomass as well as to examine food consumption and composition for antarctic fish; and biochemical studies on overwintering marine animals and growth experiments with krill. The second leg being the first part of the Winter Weddell Sea Project (WWSP'86) started on June 27, 1987. Studies on the interaction of sea ice on the oceanic and atmospheric circulation along a transect following the Greenwich Meridian through the pack-ice to the antarctic coast, formed a central part of the research program. Biological work concentrated on the investigation of sea ice biota. Emphasis during the third leg (Sep. 28-Dec. 14, 1986) was put on studies of biological processes in the ice covered Weddell Sea during winter and the beginning of spring bloom. Feeding and reproduction of Weddell seals and Emperor penguins in an ice covered bay were investigated from the newly constructed Drescher Station. The volume consists of detailed reports on activities during each leg, and descriptions of the scientific work, written by a number of the participants.

D-37013

Dorogokupets, S., Mukhina, E., **Mysterious ice-bound continent,** *Science in the USSR,* Nov./Dec. 1986 No.6, p.78-85.

The 1819-1821 voyage of Bellingshausen in *Vostok* and Lazarev in *Mirny* are briefly recounted as they sailed around Antarctica and viewed it briefly on Jan. 16, 1820.

D-37014

Mitin, L., Rud', L., **Along the legendary route,** *Science in the USSR,* Nov./Dec. 1986 No.6, p.86-93, 116.

An account is given of the Soviet voyages in the *Faddey Bellingshausen* and *Admiral Vladimirsky* in 1982-1983 retracing the 1819-1821 route taken by Bellingshausen in his circumnavigation of Antarctica. The more recent voyages gave opportunity to verify locations of several antarctic islands and other features and make detailed study of the south magnetic pole and its importance in navigation. The later voyages also circumnavigated Antarctica.

D-37075

Mitin, L.I., **Antarctic round-the-world expedition on board the oceanographic ships *Admiral Vladimirskiy* and *Faddei Bellingshausen* in 1982-1983** [Krugosvetnaia antarkticheskaia ekspeditsiia na okeanograficheskikh sudakh "Admiral Vladimirskiĭ" i "Faddeĭ Bellinsgauzen" v 1982-1983 gg.], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.83-88, In Russian.

The 27th and 28th Soviet Antarctic Expedition on board the *Admiral Vladimirskiy* and *Faddei Bellingshausen,* carried out between Dec. 2, 1982 and Apr. 27, 1983, had the mapping of the southern ocean as its principal objective. The chronological events of the planning and organization phases, and the cruises themselves are summarized, and the route is outlined. The scientific program covered oceanographic, glaciological and meteorological material, and analysis of data and of the potential of various radio-navigational systems.

D-37147
Govorukha, L.S., **Glaciation and volcanism on Deception Island in the Subantarctic** [Oledenenie i vulkanizm o. Desepshen v Subantarktike], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* May 1987 No.60, p.61-68, In Russian with English summary. 23 refs.

Data obtained by the International Deception Island Expedition in 1970-71 on the present conditions of volcanism and glaciation are presented and discussed. Volcanic effects on glaciers of the island are described and main indices of the glacial regime compared to those of South Shetland Archipelago. Discussions include the effect of present volcanism on glaciers undergoing general degradation.

D-37492
Furse, C., **Joint Services Expedition to Brabant Island: overwintering in tents in Antarctica,** *Medical Society of London. Transactions,* 1984-1986 Vol.102, p.53-58.

After a brief review of some historic, geographic and climatological features peculiar to Antarctica, details of the first scientific exploration of Brabant I., carried out by a British team from Jan. 1984 to Mar. 1985, are presented. The research project included geological and biological surveys of the island and studies of human physiological responses to extreme cold. Analysis of data collected, and the preparation of first papers, are announced. A month to month account of the team's activities—mainly dealing with transportation, housing, and other difficulties connected with the hostile environment —is given.

D-37493
Futterer, D.K., ed, **Expedition ANTARKTIS-IV of RV *Polarstern* 1985/86. Report of Legs ANT-IV/3-4** [Die Expedition ANTARKTIS-IV mit FS *Polarstern* 1985/86. Bericht von den Fahrtabschnitten ANT-IV/3-4], *Berichte zur Polarforschung,* 1987 No.33, 204p., In German and English. 24 refs.

The antarctic *Polarstern* expedition from Sep. 3, 1985 to Apr. 30, 1986 was subdivided into four legs. This volume contains the cruise reports, scientific reports, and preliminary results of legs ANT-IV/3 and ANT-IV/4. ANT IV/3 began on Dec. 6, 1985 and comprised a scientifically and logistically complex program in the southern and eastern Weddell Sea. The most important programs completed during this leg were: the supplying and extension of Georg von Neumayer Station; glaciological and aerogeophysical measurements near Neumayer Station; geological land traverse from Neumayer Station to the Kottas Mountains; supplying the Filchner Summer Station; quantifying the mass budget of Filchner-Ronne Ice Shelf; and sediment sampling of specific profiles in the Weddell Sea deep basin. ANT IV/4 began on Mar. 18, 1986 and included three major projects: geochemical investigations of the oceanic crust east of Bouvet Island; taking sediment core samples and bathymetric measurements along a meridian from Agulhas Basin to Maud Rise and on Maud Rise; and retrieving a year-long mooring of current meters and sediment traps from the Weddell Sea.

D-37503
Gremman, N.J.M., **Netherlands South Georgia Scientific Expedition** [Nederlandse Wetenschappelijke South Georgia Expeditie], *Circumpolar journal,* 1988 3(1-2), p.1-53, In Dutch with English summary. Refs. p.50-53.

In the southern summer of 1986/87 a Dutch expedition visited the subantarctic island of South Georgia. The aim of the expedition was to collect biological information on the island's ecosystems and the influence of man upon them, and to enhance the appreciation of the value and beauty of the subantarctic regions and the interest in nature conservation in this region. The expedition spent one month on South Georgia. Another week was spent in the Falkland Islands, where some biological information was also collected. Botanical studies focused on the consequences of the isolated location of the island, particularly on how the plants got there and how they survive. Avian species are identified, counted, and studied as to breeding behavior and success. Birds seen were penguins, albatross, petrels, prions, skuas, shags, and a South Georgia pintail. Reindeer, brown rats, and seals were the mammals seen and counted.

See also:
A-35627 A-36584 G-35471 J-35346 J-35347

E. GEOLOGICAL SCIENCES

E-34564
Smit, J.H., Stump, E., **Sedimentology of the La Gorce Formation, La Gorce Mountains, Antarctica,** *Journal of sedimentary petrology,* Sep. 1986 56(5), p.663-668, 34 refs.

The La Gorce Formation is a sequence of alternating metagraywacke, phyllite, and metapelite. Three bedding associations are recognized. The predominant type consists of massive or laminated graywacke beds in delayed graded contact with overlying thin mudstones. Of secondary importance are beds with characteristics of Bouma's model turbidite, mainly A, C, and E divisions. Beds of laminated sandy siltstones are of minor importance. The graywackes are matrix rich (54-76%). Petrographic examination shows no rock fragments that are diagnostic of provenance but does show a suite of detrital minerals that are indicative of a fairly high-grade metamorphic source. The environment of deposition is interpreted to have been middle-fan, depositional lobe, in a particularly broad shelf-rise setting. (Auth.)

E-34677
Harding, B.W., Rabinowitz, P.D., **High latitude drilling in the ocean drilling program,** International Offshore and Navigation Conference and Exhibition, Helsinki, Oct. 27-30, 1986. POLARTECH '86. [Proceedings], VTT Symposium 70, Espoo, Valtion teknillinen tutkimuskeskus, 1986, p.83-106, 13 refs.

The Ocean Drilling Program (ODP) is a long term program of scientific ocean drilling with the primary scientific objectives of studying the origin and evolution of the oceanic crust; the tectonic evolution of continental margins; the origin and evolution of marine sedimentary sequences; long term changes in the atmosphere, oceans, cryosphere, biosphere and magnetic field; and development of new tools and technology for deep ocean exploration and drilling. The drillship *Joides Resolution* was chosen by ODP because of its ice strengthened hull and ability to operate in polar areas. Experiences on cruises in the polar regions of the Labrador Sea/Baffin Bay and the Norwegian Sea are described together with plans for forthcoming cruises in the southern polar regions of the Weddell Sea in Antarctica. (Auth.)

E-34679
Krasheninnikov, V.A., Basov, I.A., **Cenozoic stratigraphy of the southern ocean** [Stratigrafiia kaĭnozoia IUzhnogo okeanaȝ, Akademiia nauk SSSR. Geologicheskiĭ institut. Trudy, No.410, Moscow, Nauka, 1986, 206p., In Russian. Refs. p.187-198.

This book presents extensive review of literature on stratigraphy of Cenozoic layers in high latitudes of the Southern Hemisphere. Tables showing stratigraphic distribution of planktonic and benthic foraminifera of that era are appended. History of geology and climate is discussed. Information concerning antarctic and subantarctic regions is sprinkled throughout the book, and pages 103-109 deal exclusively with the Ross Sea and the Bellingshausen Basin.

E-34708
Crohn, P.W., **Geology and geomorphology of Macquarie Island with special emphasis on heavy metal trace element distribution,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1986 No.39, 28p., 13 refs.

New geological and geomorphological relationships established on Macquarie I. are discussed, with special emphasis on the evolution of composite landforms, field relations of the major rock groups, the sulphide occurrences, and trace element distributions, especially of heavy metals, in both mineralized and unmineralized rock types. The study was carried out between Oct. 1983 and Oct. 1984.

E-34711
Wald, D.J., Wallace, T.C., **Seismically active section of the southwest Indian ridge,** *Geophysical research letters,* Oct. 1986 13(10), p.1003-1006, 18 refs.

The section of the southwest Indian Ocean Ridge west of the Prince Edward Fracture zone has a large ridge axis offset and a complicated ridge-transform morphology. Source mechanisms of transform earthquakes along this portion of the ridge have been determined from an inversion of long-period P and SH waveforms. The seismicity is characterized by anomalous faulting mechanisms, source complexity and an unexpectedly large seismic moment release. Several earthquakes with dip-slip components of faulting have been recognized on the central section of the Andrew Bain and 32 deg E transforms suggesting geometrical complexity along the transform. The calculated slip rate over a period of 60 years is three times greater than the expected rate of spreading. (Auth. mod.)

E-34726
Geological Society of America. North-Central Section, **19th annual meeting,** *Geological Society of America. North-Central Section. Abstracts with programs,* Apr. 25-26, 1985 17(5), p.277-334.

DLC QE1.G19

This volume contains the program and abstracts of papers presented at the 19th annual meeting of the North-Central Section of the Geological Society of America and its associated societies. Abstracts of papers pertinent to Antarctica appear on p.277, 285, 291, 293, 298, 300, 328, and 331.

E-34728
Anderson, J.B., Wright, R., Andrews, B., **Weddell Fan and associated abyssal plain, Antarctica: morphology, sediment processes, and factors influencing sediment supply,** *Geomarine letters,* 1986 6(3), p.121-129, 27 refs.

The newly discovered Weddell Fan covers 0.75 m. sq km. The adjacent continental shelf is characterized by deep, rugged topography; the inner shelf is covered by a grounded polar ice sheet. The upper fan has numerous deep, V-shaped canyons that intersect a slope-base, leveed fan valley. Piston cores from the valley contain disorganized gravel grading upward into graded gravel and sand. Levee cores contain interbedded hemipelagic sediments and fine-grained turbidites. The lower fan is sand-rich. Sediment supply to the fan apparently occurred before development of glacial shelf topography and during a more temperate glacial setting. (Auth.)

E-34732
Barsch, D., Mäusbacher, R., **New data on the relief development of the South Shetland Islands, Antarctica,** *Interdisciplinary science reviews,* June 1986 11(2), p.211-218, Refs. p.217-218.

Planation surfaces on the Antarctic Peninsula and the neighboring islands seem to be fairly old. The prominent marine erosion sur-

face on Fildes Peninsula, 35-45 m above mean sea level, is probably older than 85,000 years—older than the last interglacial period and the penultimate glaciation. All Holocene beaches, which are situated between 20 m and the present coastline, were formed during the last 6000 years. Before 6000 BP the islands were still completely glaciated. The breakdown of the ice cover to nearly the present extent must have been extremely abrupt, taking no more than 1000 years (6000 to 5000 BP). Between 3000 and 1000 BP there were at least two readvances. These advances were restricted to the prominent outlet glaciers, which followed pre-existing valleys. (Auth. mod.)

E-34759

Gooding, J.L., **Clay-mineraloid weathering products in antarctic meteorites,** *Geochimica et cosmochimica acta,* Oct. 1986 50(10), p.2215-2223, 26 refs.

Clay mineraloids are associated with gypsum, K-Fe-sulfates (possibly jarosite), cryptocrystalline rust, and possibly with zeolites and/or (secondary) alkali feldspars as terrestrial weathering products in stony meteorites from the Allan Hills (ALH) and Elephant Moraine (EET) collection areas in Victoria Land, Antarctica. Weathering formed fracture fillings in fusion crusts of eucrites EETA 79004 and EETA 79005, diogenites ALHA 77256 and EETA 79002, shergottite EETA 79001 and H5-chondrite ALH 82102 and decomposition products of glass and plagioclase in interior samples of achondrites. Clay mineraloids displayed massive to incipient-vermicular forms with elemental compositions that suggest smectite- and mica-like phases. Deposits were too small to yield pure material for phase identification although x-ray diffractometry and differential scanning calorimetry of bulk samples suggested that the clay mineraloids were not well crystallized. (Auth. mod.)

E-34760

Pal, D.K., **Beryllium-10 contents of shergottites, nakhlites, and Chassigny,** *Geochimica et cosmochimica acta,* Nov. 1986 50(11), p.2405-2409, 25 refs.

Accelerator mass spectrometry gives the following Be-10 contents (dpm/kg) for the SNC meteorites: Shergotty, 13.0 and 17.3; Zagami, 18.6 and 20.0; ALHA 77005, 15; EETA 79001A, 7.8 and 6.3; EETA 79001B, 8.5; Nakhla, 19.7; Lafayette, 18.1; Governador Valadares, 25.6; Chassigny, 20.5. The Be-10 contents of the NC meteorites indicate that significant accumulation of cosmogenic nuclides occurred in decimeter rather than planetary-size bodies. The agreement of the He-3, Ne-21, and Be-10 exposure ages of the shergottites also supports small-body irradiation. A long terrestrial age for EETA 79001 appears unlikely. (Auth.)

E-34761

Shimizu, H., Masuda, A., **REE patterns of eucrites and their genetic implications,** *Geochimica et cosmochimica acta,* Nov. 1986 50(11), p.2453-2460, 41 refs.

Rare earth element (REE) abundances in eucrites were precisely determined on Juvinas, Pasamonte, Cachari, Stannern and antarctic eucrites Y-74450,63,D+G; Y-75015,20,E+F; Y-75001,73; Y-790007,61,F; Y-75011,84,D-1 and Y-790007,61,E-4. The last two samples are eucrite clasts from polymict eucrites. The other antarctic eucrite samples are matrix from polymict eucrites. Like the Stannern eucrite, all of the antarctic eucrites have relatively high REE abundances. REE abundances in two clast samples are higher than those in the Stannern and matrix samples of the antarctic eucrites. When REE abundances in the antarctic eucrites and the Stannern eucrite are normalized by the REE abundance suite of the Juvinas or Pasamonte eucrites, highly linear REE patterns are obtained. For the Juvinas- or Pasamonte-normalized REE patterns of the antarctic and Stannern eucrites, the inclination of the linear REE patterns increases with increasing REE abundances. These observations suggest that the eucrites with larger REE abundances such as the Stannern and antarctic eucrites were produced as residual liquid in a fractional crystallization process from the main group of eucrites (e.g., the Juvinas eucrite). On the other hand, the Moore County cumulate eucrite is considered to be a solid phase formed in this process. (Auth.)

E-34768

Yoshida, Y., ed, **Proceedings of the sixth Symposium on Antarctic Geosciences, 1985,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, 165p., For individual papers see C-34769, E-34775 through E-34780, F-34781, G-34772, J-34774, L-34770, 34771, and 34773 or 41-1469 through 41-1472.

In this annual symposium, thirty papers were read: nine in geology and petrology, fifteen in solid earth geophysics, three in geomorphology, and three in geochemistry. The thirteen papers of this volume deal with mineralogy and petrology of highly metamorphosed rocks, isotopic ages of rocks, paleomagnetism of Precambrian rocks, marine geological and geophysical surveys, marine gravity measurements, results of remote sensing and positioning by satellites, organic chemistry of Paleozoic rocks, and snow accumulation study by isotope geochemistry. (Auth. mod.)

E-34774

Mizukoshi, I., **Preliminary report of geological and geophysical surveys off Amery Ice Shelf, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.48-61, 10 refs.

These surveys were carried out during the 1984-1985 antarctic summer season. The surveyed area involves the continental shelf, slope, rise, the abyssal plain and part of the Kerguelen Plateau. Thickness of the sedimentary layer beneath the continental shelf is estimated to be more than 3.5 km from a sonobuoy result. A series of upper strata progrades seaward and is eroded at the sea bottom. In the continental slope, rise and the abyssal plain, the presence of sediments whose thickness exceeds 6 km is confirmed. The sediments seem to become thicker toward the continent, particularly the center of Prydz Bay to which the Lambert graben is thought to extend from inland Antarctica. In the southwestern margin of the Kerguelen Plateau, the acoustic basement rises toward the Plateau, and is thinly covered by an acoustic transparent layer of relatively old age. Dipping strata suggest that the acoustic basement consists of highly consolidated sedimentary layers which have been subjected to a complex tectonic movement related to the origin of the Plateau. (Auth.)

E-34775

Hiroi, Y., **Mode of occurrence, bulk chemical compositions, and mineral textures of ultramafic rocks in the Lützow-Holm complex, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.62-84, 47 refs.

Available data on characteristics of ultramafic rocks in the Late Proterozoic Lützow-Holm Complex are summarized. The bulk chemical compositions suggest that most of them are derived from various parts of layered gabbro. Some are troctolitic, being composed mainly of normative olivine and plagioclase without pyroxenes. The mode of occurrence in the field suggests that they were tectonically fractured and emplaced in the metasedimentary gneisses. Their occurrence mainly in the western part of the Lützow-Holm Complex suggests that original gabbroid masses were present in the presently missing part between the adjacent Lützow-Holm and Yamato-Belgica Complexes. The mineral textures, especially those of garnet and spinel, suggest changing metamorphic conditions within the spinel-amphibole lherzolite facies during prograde recrystallization of the rocks from earlier relatively high-pressure and low-temperature conditions to later lower-pressure and high-temperature conditions. (Auth.)

E-34776
Suzuki, M., **Short note on ultramafic granulites in the Ongul Islands area, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.85-100, 19 refs.

Ultramafic granulites in the East and West Ongul Islands area are grouped into two types, A and B. One of the fundamental criteria of the grouping is that type A does not yield plagioclase and type B does. Type A is characterized by the abundance of orthopyroxene and clinopyroxene and by the lack of plagioclase and garnet. It occasionally yields olivine. Type B is characterized by the the presence of plagioclase and/or garnet and by the poverty in pyroxenes. In common cases, type A tends to occur as massive isolated blocks or pods in the surrounding gneisses, while type B as concordant sheets or layers showing a distinctly foliated structure. Between these two types, chemical characteristics of main constituent minerals such as orthopyroxene, clinopyroxene and hornblende are different from each other. Those in type A are comparatively more magnesian and less aluminous. Metamorphic temperature of both types is as high as near 800 C; pressure is calculated at about 7.5 kb. The essential difference between the two types is inferred to reflect the difference in petrological character of the original rocks. (Auth.)

E-34777
Asami, M., Kojima, H., Yanai, K., Nishida, T., **Amphibolite-facies mineral assemblages in the Belgica Mountains, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.101-115, 28 refs.

In this first petrological study of metamorphism in the Belgica Mountains mineral assemblages are examined and the metamorphic conditions are preliminarily estimated. The amphibolite-facies metamorphism is indicated by the mineral assemblages. Besides the occurrence of clinohumite and chondrodite in dolomitic marble, the following features are characteristic of the assemblages: the absence of garnet in metabasites and the presence of the calcite-quartz and Ca-garnet-quartz associations and no wollastonite in calcareous rocks. The garnet-biotite thermometry gives metamorphic temperatures of 680-700 C. The five-phase assemblage forsterite-tremolite-dolomite-calcite-spinel in dolomitic marble is noted for a fluid pressure estimate in this rock. Total fluid pressures around 5 kb at 680-700 C are obtained from the experimental equilibrium relations concerning the five-phase assemblage. (Auth.)

E-34778
Kojima, S., Shiraishi, K., **Note on the geology of the western part of the Sör Rondane Mountains, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.116-131, 6 refs.

According to investigations of JARE-26, the Sör Rondane area is underlain by various kinds of metamorphic and plutonic rocks. Foliation of gneisses trends E-W, dipping monoclinally southward. The metamorphic rocks are divided into a northern and a southern group. A pronounced shear zone separates the two groups. Although metamorphic grade of the regional metamorphism reaches up to the granulite facies in the northern group, mineral assemblages showing the epidote-amphibolite facies are commonly observed in the southern part of the northern group and in the southern group. Plutonic rocks are granite, syenite and diorite which form sporadic stocks and small masses throughout the region. Slightly metamorphosed dolerite dikes which show distinct chilled margins intrude the metamorphic rocks. Newly obtained whole-rock K-Ar age on the dolerite indicates 536 Ma. (Auth.)

E-34779
Shibata, K., Yanai, K., Shiraishi, K., **Rb-Sr whole-rock ages of metamorphic rocks from eastern Queen Maud Land, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.133-148, 31 refs.

Rb-Sr whole-rock isochron ages were determined on the Lützow-Holm and Yamato-Belgica Complexes from eastern Queen Maud Land. Metamorphic rocks from East Ongul Island, Nesöya, Sinnan Rocks and the Yamato Mountains gave ages ranging between 683.0 and 722.1 Ma. Rocks from Skarvsnes gave older ages of 1131 and 1033 Ma. All these ages are interpreted to represent the times of high-grade metamorphism. The Skarvsnes area was apparently not affected by the 700 Ma metamorphism. The initial Sr-87/Sr-86 ratios of metamorphic rocks show a considerable variation on local as well as regional scale. The higher initial ratios of the Yamato Mountains suggest that the protolith of the Yamato-Belgica Complex is older than that of the Lützow-Holm Complex.

E-34780
Matsumoto, G.I., Funaki, M., Machihara, T., Watanuki, K., **Alkanes and alkanoic acids in the Beacon Supergroup samples from the Allan Hills and the carapace Nunatak in Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.149-158, 20 refs.

Samples of sedimentary rocks, silicified wood and coal in southern Victoria Land were studied to elucidate the organic sources and sedimentary paleoenvironment. Normal alkanes, pristane and/or phytane were found in all the samples studied at varying concentrations and had near unity of carbon preference index. The major constituents were all short-chain *n* alkanes, pristane and/or phytane. Normal alkanoic acids were found in a sedimentary rock from the Carapace Nunatak and in silicified wood from the Allan Hills with low concentrations, together with the dominance of even carbon numbers. The higher abundances of long-chain *n* alkanes and *n* alkanoic acids in the sedimentary rock from the Carapace Nunatak imply that the contribution of land plants to the sedimentary paleoenvironment of this area was greater than that in the Allan Hills. The pristane/phytane ratios suggest that the sedimentary paleoenvironment of the Allan Hills was oxic compared with that of the Carapace Nunatak.

E-34800 Barrett, P.J., ed, **Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound,** New Zealand. Department of Scientific and Industrial Research. DSIR bulletin 237, Wellington, New Zealand, Science Information Publishing Centre, 1986, 174p., For individual papers see E-34801 through E-34803, E-34805 through E-34814, and L-34804. 26 refs.

The terrestrial stratigraphic record of the Ross Sea region of Antarctica has 150 m.y. missing from Early Jurassic, when Ferrar magmatism ended, to Early Miocene, when the first eruptions of the McMurdo Volcanics began. Somewhere in this period the East Antarctic Ice Sheet developed and the Transantarctic Mountains began to rise, but no strata in which these events have been recorded have been found on land. MSSTS-1 (McMurdo Sound Sediment and Tectonic Studies, 1st core) was an attempt to fill the gap by coring strata offshore but adjacent to the ice sheet and the mountains. MSSTS-1 was drilled in November 1979 12 km northeast of Butter Point in 195 m of water, and cored to 227 m sub-bottom. The cored strata consist entirely of glacigenic sediment, mainly sandy mudstone and muddy sandstone with lonestones, but also a number of diamictites, considered to have been deposited as basal tills. The strata range in age from Quaternary back to Late Oligocene. The base of the glacial sequence, inferred to be at 300 m sub-bottom, was not reached. The

drilling history in adjacent areas is reviewed in the activities of the DVDP and *Glomar Challenger* programs; some of the difficulties of drilling and data interpretation are discussed; and the general drilling environment is described. Sketches are provided. (Auth. mod.)

E-34801

Barrett, P.J., McKelvey, B.C., **Stratigraphy,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.9-52, 20 refs.

MSSTS-1 (77.5S 163.4E) cored strata consist mainly of poorly sorted mudstone and sandstone with scattered lonestones (73% of core), but also include 8 diamictite units (16%) and 3 moderately sorted shallow water sandstone beds (11%). Strata above this are less well dated, but are probably Early Miocene, Early Pliocene and Late Quaternary in age. Each unit, delineated by a depth segment, is described as to composition and approximate age, except for Units 4, 5, and 6 which are not dated. Dating of the core from diatom and paleomagnetic studies indicates the core from 226 m to 115 m sub-bottom to represent more or less continuous sediment accumulation from 30 to 24 m.y. ago. Strata above this are less well dated, but are probably Early Miocene, Early Pliocene and Late Quaternary in age. Core logs on a scale of 1:40 and photographs of the boxed core are included as appendices. (Auth. mod.)

E-34802

Barrett, P.J., **Sediment texture,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.53-68, 16 refs.

Fifty eight grain size analyses from the MSSTS-1 core are presented and discussed. The upper part of the core (0-71 m) consists mainly of very poorly sorted sandy mudstone deposited in a deep-water shelf environment similar to that of the site today. However, the lower part of the core (115-227 m) shows progressive changes in sorting and mean grain size that conform to the pattern typical of a wave-dominated shelf, which is then used to infer water depth from sediment texture. A major shallowing is indicated from 30 to 29 Ma and a deepening at 26 Ma with some fluctuations in between. The core contains a number of diamictite beds, that are much sandier than diamictites from other continents, but are similar to basal debris from glaciers in the adjacent Transantarctic Mountains. (Auth.)

E-34803

Harwood, D.M., **Diatoms,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.69-107, 114 refs.

This paper describes the upper Miocene-lower Pliocene and upper Oligocene to lower Miocene marine diatom floras recovered from the 227 m glacial-marine MSSTS-1 drill core. These represent the southernmost occurrence known to date. Over one hundred and thirty siliceous microfossil taxa are described and/or illustrated. A provisional upper Oligocene to lower Miocene diatom biostratigraphic zonation based primarily on MSSTS-1 diatom data with supporting information from southern ocean DSDP Site 513A is proposed for the Ross Sea region. Diatom assemblage diversity and composition fluctuate between benthic-dominated shallow and planktonic-dominated deep water assemblages and probably reflect glacially induced eustatic changes. Between about 216 and 214 m a dramatic drop in diatom diversity uphole and an increase in the benthic to planktonic diatom ratio suggests an abrupt shallowing. This event is centered at about 30 Ma (paleomagnetic data) and corresponds to the largest regression of the Cenozoic which has been attributed to a major increase in the volume of Antarctic ice. Fifteen meters of glacial-marine sediments with dropstones below the record of this about 30 Ma climatic event in MSSTS-1 indicate that ice was present at sea level in the western margins of the Ross Sea region more than 31 million years ago. (Auth. mod.)

E-34805

Webb, P.N., Leckie, R.M., Ward, B.L., **Foraminifera (Late Oligocene),** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.115-125, 25 refs.

Twenty-nine species of foraminifera were recovered from the upper Oligocene (115-223 m interval sub-bottom) of the MSSTS-1 drillhole. The total fauna consists of 14, 13, and 2 species of agglutinated, calcareous benthic, and planktonic species, respectively. This part of the MSSTS-1 succession is correlated by foraminifera with late Oligocene assemblages in the basal sediments of DSDP Site 270, south-central Ross Sea. Three informal assemblage zones are recognized, but the utility of these subdivisions is not as yet tested beyond the immediate drill-site. Foraminiferal distribution patterns within and between the three zones are closely correlated with grain size and other variations in the enveloping sediments. The entire succession was deposited on southwest margins of the Victoria Land Basin, in a complex of relatively shallow water glacial and glaciomarine environments. Data derived from diversity fluctuations, faunal associations and the stratigraphic distribution of minimum diversity intervals are interpreted in terms of bathymetric trends and glacial/interglacial history. Seismic reflector and polarity changes commonly coincide with low diversity very shallow water assemblages or barren intervals, perhaps implying that there is an ice-loading effect on the paleomagnetic record. (Auth.)

E-34806

Webb, P.N., **Foraminifera (Late Cenozoic),** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.127-129, 14 refs.

The upper 70 m of marine glacial sediment in the MSSTS-1 succession contain Lower Miocene, Pliocene, and Holocene foraminiferal assemblages. Pliocene sediments contain the most abundant and diverse assemblages. Recycled foraminifera and macrofossil debris are prevalent throughout, but are particularly common in the Lower Miocene and Quaternary. A large hiatus involving at least 10 Ma separates Lower Miocene and Pliocene sediments at 32 m sub-bottom. Isobathyal Pliocene sediments present in MSSTS-1 and DVDP-8-10 drill holes, accumulated on adjacent structural blocks, are separated by a major north-south trending fault. Vertical displacement is 73 m, the base of the Pliocene strata being situated at 228 m and 155 m below sea level, respectively. The age of these sediments is considered to be in the range 2-4 Ma, indicating a net displacement of 18-36 m/Ma, and implying a low level of tectonic activity on the coastal faults of south Victoria Land since this period of sedimentation began. Displacement over the same time interval between MSSTS-1 and central Wright Valley is about 95 m/Ma, indicating a greater displacement on faults inland of DVDP-8-10 during the same period. (Auth.)

E-34807

Truswell, E.M., **Palynology,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.131-134, 18 refs.

Twenty-six samples from MSSTS-1 were processed for palynology. Recovery was poor, and most palynomorphs are considered to

be recycled from older deposits. Dinoflagellate cysts are mainly of Eocene age, and belong to a high latitude suite recovered initially from erratic boulders at McMurdo Sound. Older palynomorphs mixed with the dinocysts include Late Jurassic to Early Cretaceous spores and pollen, of unknown source, and Permian spores and pollen which are known to occur in upper Beacon Supergroup sediments in the Transantarctic Mountains. Tertiary pollen is rare and poorly diversified, consisting mainly of that of *Nothofagus* and Podocarpaceae. The sparseness of land-derived pollen from Late Oligocene to Early Miocene sediments at this near-shore site makes it unlikely that land areas in the vicinity bore much vegetation at this time. The demonstrated presence of only recycled palynomorphs in the Late Oligocene at MSSTS-1 increases the possibility that pollen and spores in coeval sediments at DSDP Site 270 are also recycled. (Auth.)

E-34808

Barrett, P.J., McKelvey, B.C., Walker, B.C., **Sand provenance,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.137-144, 6 refs.

The MSSTS-1 core can be subdivided into 4 distinct zones based on sand grain composition: zone 1 (0-58 m) fedspathic and volcanic; zone 2 (60-137 m) mainly feldspathic; zone 3 (143-200 m) feldspathic and quartzose (sedimentary); zone 4 (204-227 m) feldspathic and volcanic. These zones can be interpreted in terms of changes in proportion of sediment supplied by three local source terrains; the granitic and metamorphic basement, quartzose strata of the Beacon Supergroup and the intruding Ferrar Dolerite, and alkaline volcanics of the McMurdo Volcanic Group. Paleontological dating of the core suggests that the present phase of McMurdo Volcanic Group activity began 21 m.y. ago, but that an earlier phase died out about 30 m.y. ago. The proportion of Beacon to basement grains does not simply decline uphole, as a simple unroofing model would require. Fluctuations in this value suggest significant shifts in ice direction with time. (Auth.)

E-34809

Gamble, J.A., Barrett, P.J., Adams, C.J., **Basaltic clasts from Unit 8,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.145-152, 25 refs.

Pebbles in a 6 cm-thick layer 213 m below the sea floor at MSSTS-1 are mainly basalt. Some clasts have a carbonate coating that suggests they are reworked form a pre-existing limestone. The basaltic grains compare closely in mineralogy and chemistry with rocks of the McMurdo Volcanic Group. The diatom and paleomagnetic stratigraphies indicate that the age of the 213 m level and hence a minimum age for the pebbles, is 30 Ma. However, K-Ar ages from two samples of the basaltic pebbles are younger (14 and 24 m.y.) and the age discrepancy is not understood. The pebbles appear to represent a period of mainly basaltic volcanism, and presumably active rifting, at some time in the Early Cenozoic. (Auth.)

E-34810

Claridge, G.G.C., Campbell, I.B., **Clay mineralogy,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.153-156, 11 refs.

The nature of the clay-size fractions of 28 samples taken from the MSSTS-1 core has been determined. They were found to consist largely of amorphous silica dissolved from the tests of diatoms. Clay minerals found in the core were illite and vermiculite with some smectite. The clay mineralogy of the core material is consistent with its having been derived by glacial erosion from material weathering under conditions similar to those prevailing at the present time in coastal Victoria Land. No evidence was found that the drillhole penetrated sediments derived from a preglacial land surface. (Auth.)

E-34811

Nakaya, S., Torii, T., **Geochemistry and sedimentation,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.157-160, 6 refs.

XRD analysis, chemical analysis of water and perchloric acid extracts, and grain size analysis were carried out on 23 samples from the MSSTS-1 core. XRD analysis shows the primary mineralogy to be quartz, feldspar, and micas, with halite, calcite, and gypsum as secondary minerals in some samples below 129 m. The water and perchloric acid extracts have similar anion and cation contents to samples from DVDP-8, 9, and 10. Total soluble cation content is shown to be inversely proportional to median grain size. (Auth.)

E-34812

Collen, J.D., Froggatt, P.C., **Depth of burial and hydrocarbon source rock potential,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.161-164, 14 refs.

Analysis of porosity and density measurements from the MSSTS-1 samples, which are well-lithified below 18 m, suggests that a kilometre or more of sediments may have been eroded, in agreement with previous suggestions. The few vitrinite reflectance determinations show a wide scatter, but even the lowest values suggest removal of 2 km or more of sediment. It is considered here that the lesser figure for the amount of eroded sediment is the more reliable, and that the vitrinite fragments are reworked from older strata. The sediments are immature for hydrocarbon generation and have no future hydrocarbon-generating potential. (Auth.)

E-34813

Froggatt, P.C., **Seismic velocities,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.165-166, 8 refs.

Seismic velocities measured on cores of marine glacial sediment from MSSTS-1 show a regular increase in depth down to 100 m. The observed gradient of V (km/s) = 19.0D (km) + 1.6 is almost 10 times steeper than the gradient measured by seismic refraction techniques. Beneath 100 m, however, there are numerous velocity reversals, which provide suitable impedance contrasts to explain the several seismic reflectors identified by shipboard seismic profiling measurements in McMurdo Sound. High velocities (up to 5.1 km/sec) were found in hard sandstone layers occurring deep in the hole, presumably as a result of silica cementation. Interbedded mudstone shows no increase in velocity with depth. The strong cementation may be due to gas overpressuring at depth, lithostatic loading by 1 km of sediments, now removed, or a combination of the two effects. (Auth.)

E-34814

Davey, F.J., Christoffel, D.A., **Correlation of seismic reflection data,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.167-172, 16 refs.

Marine seismic reflection profiles across McMurdo Sound have been used to relate the sediments underlying the deeper part of

McMurdo Sound with the results of the MSSTS-1 drillhole. A major unconformity under the western slope of the sound (Reflector Y) can be tentatively traced to the base of Unit 5 (141 m sub-bottom) in the drillhole (26 Ma). However, this chronology assumes more or less continuous sediment accumulation from 24.5 to about 31 Ma. Either there is a substantial time break not yet recognized, possibly in the unsampled section from 70-115 m sub-seafloor, or Reflector Y in fact corresponds to an older lithologic boundary beneath the base of the drillhole. Better data are needed to resolve the issue, but in any event the present data show that the sedimentary sequence under McMurdo Sound is mainly Early Cenozoic or older in age. The seismic records also show major erosion of the younger sediments, possibly by slumping, from the western slope into the deeper water of McMurdo Sound. (Auth.)

E-34824

Birkenmajer, K., Gazdzicki, A., **Oligocene age of the *Pecten* conglomerate on King George Island, West Antarctica,** *Polska Akademia Nauk. Bulletin. Série des sciences de la terre,* 1986 34(2), p.219-226, With Russian summary. 30 refs.

Glacio-marine sediments of the Polonez Cove Formation with its *Pecten* conglomerate (Low Head Member) unit (King George I.) contain a rich and predominantly invertebrate fauna of Tertiary character. Calcareous nannoplankton suggests an Oligocene age. Potassium-argon dating of lavas overlying the glacio-marine strata indicates that they pre-date the Oligocene/miocene boundary. The lower age limit of these sediments probably does not significantly exceed 24.5 Ma as indicated by K-Ar dating of andesite lavas associated with plant-bearing strata *(Nothofagus*-podocarp assemblage), showing no influence of glacial climate. (Auth.)

E-34838

Coffin, M.F., Davies, H.L., Haxby, W.F., **Structure of the Kerguelen Plateau province from Seasat altimetry and seismic reflection data,** *Nature,* Nov. 13, 1986 324(6093), p.134-136, 22 refs.

The Kerguelen Plateau in the southern Indian Ocean stands 2-4 km above the adjacent sea floor and is 2,500 km long. Seasat provided a unique data set for deriving the free-air gravity field of the region. The results of a new analysis of the plateau province's structure employing both Seasat and newly-acquired multichannel seismic (MCS) data for ground truth were reported. The northern sector is characterized by volcanism and a sedimentary basin; the southern sector by a broad anticlinal arch, major faulting, and a sedimentary basin; and the eastern sector by an abyssal basin and bounding ridge. The three sectors argue for a more complex tectonic evolution of the feature than has been previously proposed. (Auth.)

E-34860

Fitzgerald, P.G., Sandiford, M., Barrett, P.J., Gleadow, A.J.W., **Asymmetric extension associated with uplift and subsidence in the Transantarctic Mountains and Ross Embayment,** *Earth and planetary science letters,* Dec. 1986 81(1), p.67-78, 54 refs.

Apatite fission track data combined with regional geological observations indicate that the uplift of the Transantarctic Mountains has been coeval with thinning and subsidence of the crust beneath the Ross Embayment. In the Dry Valleys region of south Victoria Land, the mountains have been uplifted about 5 km since the early Cenozoic at an average rate of about 100 m/Ma. During uplift, the crust remained at constant thickness or was slightly thickened by magmatic underplating. In contrast, the crust beneath the Ross Embayment has been extended and consequently thinned beginning in the Late Cretaceous but mainly during Cenozoic times. It is suggested that the uplift of the Transantarctic Mountains and the subsidence of the Ross Embayment result from passive rifting governed by a fundamental structural asymmetry defined by a shallow crustal penetrative detachment zone that dips westward beneath the Transantarctic Mountain Front. The localization and asymmetry of this detachment and its unusually deep level expression are attributed to a profound crustal anisotropy inherited from an early Palaeozoic collision along the present site of the mountain range. (Auth.)

E-34863

Davison, A.P., **Investigation into the relationship between salt weathering debris production and temperature,** *Earth surface processes and landforms,* May-June 1986 11(3), p.335-341, 20 refs.

An investigation using laboratory simulation has been made using air temperature data for Tunisia, Antarctica, and southwest England. An experiment with a 50 cycle run produced results which showed significantly greater debris production in the Antarctic and Tunisian simulations than in the southwest England simulation. Using X-ray analysis to determine salt penetration, an inverse relationship between salt penetration and debris production was seen to exist. This could be the result of evaporation in the Tunisian simulation and rapid freezing in the Antarctic simulation, concentrating salts in the upper layers of the rock samples. The authors tentatively suggests the possible existence of a parabolic relationship between salt weathering and temperature.

E-34870

Vennum, W.R., Rowley, P.D., **Reconnaissance geochemistry of the Lassiter Coast Intrusive Suite, southern Antarctic Peninsula,** *Geological Society of America. Bulletin,* Dec. 1986 97(12), p.1521-1533, 74 refs.

Calc-alkaline plutonic rocks of the Lower Cretaceous Lassiter Coast Intrusive Suite are the predominant rocks exposed in the Lassiter, Orville, and southern Black Coasts and eastern Ellsworth Land. Compositions range from granite to gabbro. K-Ar and Rb-Sr isotopic ages are in the range 130-95 m.y., Early Cretaceous. Magmas were formed in the roots of an Andean-type magmatic arc developed on continental crust during Pacific plate subduction and were emplaced at high crustal levels as one-mica (biotite) granitoids. The batholithic rocks of the southern Antarctic Peninsula are similar to southeastern Australian I-type granitoids, and to other circum-Pacific batholith terranes. Geochemical features of the southern Antarctic Peninsula batholith complex that are shared with other circum-Pacific subduction-related magmatic arcs include moderate to low iron enrichment, late K2O enrichment, transition from diopside-normative to corundum-normative rocks in the range 63% to 69% SiO2, high levels of large-ion lithophile elements (Ba, K, LREE, Rb, Sr, Th), high Ba/Sr, high large ion lithophile element/high field strength element rations, and low K/Rb ratios. (Auth. mod.)

E-34898

LaBrecque, J.L., ed, **South Atlantic Ocean and adjacent antarctic continental margin,** Regional atlas series, Ocean Margin Drilling Program; atlas 13, Woods Hole, Marine Science International, 1986, 22p., Refs. p.21.

DLC G2807.S6C9 S6

This atlas consists of 20 sheets gathering together the geologic and geophysical data sets for the Weddell and adjacent basins. Specifically, the atlas includes a portion of the major suture zone which divides East and West Antarctica and extends along the Transantarctic Mountains from the Ross Sea to the northwest Queen Maud Land margins of the eastern Weddell Basin. The data include bathymetry, topography, gravity anomalies, total intensity magnetic anomaly profiles, tectonics, total sediment thickness, seismic reflection profiles, surface sediment lithology, and sedimentary processes.

E-34901

Bogard, D.D., Hörz, F., Johnson, P.H., **Shock-implanted noble gases: an experimental study with implications for the origin of Martian gases in shergottite meteorites,** *Journal of geophysical research,* Nov. 30, 1986 91(B13), p.E99-E114, 56 refs.

The existence of trapped gases in the EETA 79001 shergottite meteorite that were apparently shock-implanted from the Martian atmosphere raises important questions as to the mechanism of gas implantation and whether the implanted gas has been mass fractionated. To study the phenomenon of shock-implantation of gases, we artifically shocked whole-rock and powder samples of a terrestrial basalt to pressures of 2-40 GPa in the presence of controlled gas mixtures ranging from .0001 to 3 atmospheres. Argon, Kr, and Xe, and to a lesser extent Ne, were readily implanted into the silicate under a wide range of experimental conditions. As exemplified by Ar, the amount of implanted gas is linearly proportional to its partial pressure over a partial pressure range of 0.0001 to 0.1 atmosphere, the former value being similar to the partial pressure of Ar on Mars. The implanted gas showed no evidence of isotopic fractionation, and for Kr and Xe fractionation limits of 0.1% per mass unit could be set. The elemental composition of shock-implanted gas also closely resembles the ambient gas phase, except that Ne is only lightly retained and readily leaks from the samples after the shock. The experimental data are consistent with shock-implantation of Martian gases without mass fractionation into shock-melted phases of EETA 79001; the progenitor of these melts may have been porous, fragmental material. (Auth. mod.)

E-34924

Petrushevskaia, M.G., **Evolution of the *Antarctissa* group,** *Marine micropaleontology,* Nov. 1986 11(1-3), p.185-195, 25 refs.

The significance of various skeletal characters for tracing phylogeny is considered for several genera of Nassellaria (Radiolaria) closely related to the *Antarctissa* group. A phylogenetic scheme is suggested for species of *Antarctissa; A. denticulata* is traced through extinct species of *Antarctissa* to *Botryopera conradae.* (Auth.)

E-34925

Granlund, A., **Size and shape patterns in the Recent radiolarian genus *Antarctissa* from a south Indian Ocean transect,** *Marine micropaleontology,* Nov. 1986 11(1-3), p.243-250, 13 refs.

A tool for size and shape analysis of microfossils has emerged from the use of computer-based edge-detecting devices. In this study, the size and shape patterns within the recent radiolarian genus *Antarctissa* have been studied throughout a N-S transect in the south Indian Ocean in an attempt to reveal the pros and cons of this new technique. The results from both the skeleton volume calculations and the calculations of number of *Antarctissa* per gram sediment reflect prevailing water mass systems in the area. Both the Polar Front and the Antarctic Divergence areas are well defined in the skeleton volume plots, as well as in the traditional distribution plots of *Antarctissa* in the transect. The shape variation within the group shows a close connection with the sea-surface temperature and salinity parameters. The shape variation within the genus *Antarctissa* does reflect water mass changes in the transect, and thus appears to be a good tool for paleoclimatological studies. (Auth. mod.)

E-34927

Valle, R.A. del, Nuñez, H.J., **Tectonic structures on the eastern edge of the Antarctic Peninsula in relation to the compression belt of the Mesozoic volcanic arc** [Estructuras tectonicas en el borde oriental de la península Antártica y su posible relación con el cinturón de compresión del arco volcánico Mesozoico], *Geoacta,* 1986 13(2), Buenos Aires. Instituto Antártico Argentino. Contribución No.321, p.313-324, In Spanish with English, French and German summaries. 15 refs.

The results of structural observations, carried out in three localities in the border zone of a sedimentary basin in the NE end of the Antarctic Peninsula are presented. The deformations which are compressional, are laid out forming a rocky strip 120 km long, and they have the same structural characteristics. They are correlated with the thrusts, thrust faults and foldings that exist in some sectors of the Peninsula and that affect also the border and the basement of the basin. Considering that the development of this basin is linked to the evolution of a volcanic arc situated before the basin, that the rocks found between the basin and the arc are strained by compression, and that the tectonic structures analyzed correspond to characteristics that are typical of this kind of deformation, it is concluded that these structures form part of the compression belt that accompanies a postarc basin. (Auth.)

E-34940

Birkenmajer, K., Narebski, W., Nicoletti, M., Petrucciani, C., **K-Ar ages of Jurassic volcanics and Andean intrusions of King George Island, South Shetland Islands (West Antarctica),** *Polska Akademia Nauk. Bulletin. Série des sciences de la terre,* 1982 30(3-4), p.121-131, 23 refs.

K-Ar whole-rock ages of the Wegger Peak Group (Andean intrusive suite) of King George I. span the time from about 60 Ma (Paleocene) to about 31 Ma (Late Oligocene). They cut through altered stratiform volcanic complexes (Jurassic volcanics) of the Cardozo Cove and Martel Inlet Groups which yielded Paleocene (about 56 Ma) and Cretaceous-Paleocene boundary (about 66 Ma) K-Ar dates respectively. The latter dates are supposed to be a result of Tertiary re-heating of late Mesozoic lava complex. (Auth.)

E-34948

Stump, E., White, A.J.R., Borg, S.G., **Reconstruction of Australia and Antarctica: evidence from granites and recent mapping,** *Earth and planetary science letters,* Sep. 1986 79(3/4), p.348-360, 82 refs.

Using all currently available geological data, a reconstruction of Australia and Antarctica is offered. The key element in the reconstruction is the alignment of three terranes in northern Victoria Land with three terranes in western Victoria, Australia. Numerous similarities permit correlation of the terranes across continental boundaries, producing a fit essentially similar to one propounded in 1969. In detail, mismatches of the coastlines are improved by postulating movements of two microplates: Tasmania is shifted back along the Colac-Rosedale fault to a pre-breakup position approximately 160 km east of its present location. The resultant gap is filled by moving northern Victoria Land 225 km northward along a postulated strike-slip fault at the boundary between the western scarp of the Transantarctic Mountains and the Wilkes Subglacial Basin. A model is proposed in which, at the initial stage of breakup, opening of the Tasman Sea was accompanied by westward movement of Tasmania and southward movement of northern Victoria Land, with a left-lateral, strike-slip fault at their mutual boundary. Once these two microplate fragments had reached their current positions on their parent plates, movement proceeded with the separation of Australia and Antarctica and continued opening of the Tasman Sea. (Auth.)

E-35008
Smoot, E.L., Taylor, T.N., **Structurally preserved fossil plants from Antarctica: II. A Permian moss from the Transantarctic Mountains,** *American journal of botany,* Dec. 1986 73(12), p.1683-1691, 59 refs. For Part I see E-32953.

An anatomically preserved moss from the late Permian of Antarctica is described. The fossils include delicate, unistratose leaves and axes with numerous rhizoids preserved in a silicified peat. Leaves exhibit a multi-layered midrib of thick-walled cells, and a lamina of rhomboidal cells that become more elongate toward the margin. The axes consist entirely of parenchyma with a central column of slightly smaller diam cells. Rhizoids are attached to the outer layer of the cortex and surround all the axes. These Permian fossils represent the oldest anatomically preserved bryophytes yet described from Gondwanaland and compare most closely with modern members of the Bryidae. (Auth.)

E-35018
Conca, J.L., Astor, A.M., **Capillary moisture flow and the origin of cavernous weathering in dolerites of Bull Pass, Antarctica,** *Geology,* Feb. 1987 15(2), p.151-154, 13 refs.

Flow of water through joint blocks that exhibit cavernous weathering was modeled for the Ferrar dolerite in Bull Pass. A peculiar moisture regime allows an analytical solution under steady-state, saturated conditions. The presence of surface coatings on the top surface of the blocks causes the matric potential gradient within the blocks to be horizontal near the surface, deflecting the flow of migrating water toward the uncoated sides during evaporation. Because weathering of the rock interior is proportional to the moisture flux, the extent of rock weathering will be similar along similar contours of the matric potential gradient. As granular disintegration occurs, it will also follow the lines of equipotential, and cavernous weathering will result if those lines are concave. (Auth.)

E-35022
Freundel, M., Schultz, L., Reedy, R.C., **Terrestrial 81Kr-Kr ages of antarctic meteorites,** *Geochimica et cosmochimica acta,* Dec. 1986 50(12), p.2663-2673, Refs. p.2671-2673.

From the "true" 38Ar exposure ages and the apparent 81Kr-Kr exposure ages of 9 Antarctic eucrite finds, terrestrial ages are calculated. They range from about 300,000 a (Pecora Escarpment 82502) to very recent falls (Thiel Mountains 82502). Polymict eucrites from the Allan Hills (A78132, A79117, and A81009) have within the limits of error the same exposure age (15.2 million a) and the same terrestrial age 100,000 a). This is taken as strong evidence that these meteorites are fragments of the same fall. A similar case are the Elephant Moraine polymict eucrites A79005, A79006, and 82600 with an exposure age of 26 million a and a terrestrial age of 180,000 a. EETA79004 may be different from this group because its exposure age and terrestrial age are 21 million a and 250,000 a, respectively. The distribution of terrestrial ages of Allan Hills meteorites is discussed. Meteorites from this blue ice field have two sources: directly deposited falls and meteorites transported to the Allan Hills inside the moving antarctic ice sheet. During the surface residence time meteorites decompose due to weathering processes. The weathering "half-life" is about 160,000 a. From the different age distributions of Allan Hills and Yamato meteorites, is is concluded that meteorite concentrations of different antarctic ice fields need different explanations. (Auth. mod.)

E-35024
Rabinowitz, P.D., **Ocean Drilling Program after 1 year of drilling operations,** Offshore Technology Conference, 18th, Houston, Texas, May 5-8, 1986. Proceedings, Vol.2, 1986, p.283-296.

DLC TC1505.O352a

This paper offers an overview of the Ocean Drilling Program, reviews the first year of scientific drilling, and describes future science plans. The latter include Leg 113, with both tectonic and paleoceanographic interests involving the Weddell Sea. Specific objectives of this leg, scheduled to be carried out Jan.-Mar. 1987, are outlined.

E-35031
Hofmann, J., **Results of structural investigations of highly or weakly metamorphosed precambrian rocks in the mountain fringes of Lambert Glacier (East Antarctica)** [Tektonische Beobachtungen im hoch- und schwachmetamorphen Präkambrium der Gebirgsumrandung des Lambert-Gletschers (Ostantarktis)], *Freiberger Forschungshefte,* 1978 No. C335, p.7-111, In German with English summary. Refs. p.48-51.

DLC QE1.F73 vol.335

The mountain fringe of Lambert Glacier—single nunataks, nunatak groups, and escarpments—is characterized by outcropping high- and low-grade precambrian rock sequences. The high-grade crystalline basement of probably archean/early proterozoic age consists of deeper (? older) parts of granulite facies sequences. In the higher (? younger) parts high temperature almandin-amphibolite sequences occur. In general, structural trends are in accordance with an archean-/early proterozoic mobile belt in the east antarctic coast region which could be named Enderby—Mac. Robertson Belt. Structures and sequence of deformation processes in the basement complex are mostly unknown. In the southern Prince Charles Mts. the basement is overlain by a low-grade metasedimentary complex, folded and metamorphosed under greenschist conditions, similar to the intracratonic Cuddapah-complex of peninsular India. Thrusting of basement rock complexes upon low-grade sequences, increasing metamorphism, and intensive folding were observed in several points at northern and southern margins of the low-grade complex. (Auth. mod.)

E-35032
Kowalski, T., **Arktowski Antarctic Station (AAS) 1978-1982,** *Polska Akademia Nauk. Instytut Geofizyki. Seismological bulletin,* 1986 B-9(193), p.3-47.

The geophysical pavilion at Arctowski Station was constructed in 1978; seismic observations began in March of that year and have continued without interruption since. Characteristics of the instrumentation and recording methods are given and the raw seismic data are presented for the nearly five year period.

E-35042
Rowe, C.A., Kienle, J., **Seismicity in the vicinity of Ross Island, Antarctica,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.375-385, 19 refs.

One hundred fifty-seven tectonic microearthquakes ($M<2.0$) were recorded in 1983 and 1984 by the ten station network on Ross Island; these events were located using the least-squares routine, HYPOELLIPSE. Of these events, 106 have RMS residual traveltime errors of 0.6 sec or less; they are clustered in the vicinity of Ross Island, but are not restricted to it. There is a linear trend of epicenters cutting across the island and continuing northward. Most activity seems to center beneath Mount Terra Nova, between Mount Erebus and Mount Terror. Mean depth for events is 8.2 km; however, depths are rather evenly distributed over a range of 0 to 25 km.

Modelling based on Bouguer gravity anomalies and seismic refraction studies indicates a depth to the Moho of about 40 km beneath the continent, shallowing to 27 km beneath the Ross Sea. This 27 km depth is approximately equal to the lower limit of the tectonic seismicity detected by the Erebus network; hence, events are of crustal origin. These data suggest, with the rift-type geochemistry of Erebus' magma, that the Ross Sea is a site of active crustal extension and rifting. (Auth.)

E-35044

Kaminuma, K., Baba, M., Ueki, S., **Earthquake swarms on Mount Erebus, Antarctica,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.391-404, 13 refs.

Mount Erebus (3794 m), located on Ross Island in McMurdo Sound, is one of the few active volcanoes in Antarctica. A high-sensitivity seismic network has been operated by Japanese and US parties on and around the volcano since Dec. 1980. The results of these observations show two kinds of seismic activity on Ross Island: activity concentrated near the summit of Mount Erebus associated with Strombolian eruptions, and micro-earthquake activity spread through Mount Erebus and the surrounding area. Seismicity on Mount Erebus has been quite high, usually exceeding 20 volcanic earthquakes per day. They frequently occur in swarms with daily counts exceeding 100 events. Sixteen earthquake swarms with more than 250 events per day were recorded by the seismic network during the three year period 1982-1984, and three notable earthquake swarms out of the sixteen were recognized in Oct. 1982. (Auth. mod.)

E-35045

Paech, H.-J., **Comparison of the geological development of southern Africa with that of the antarctic continent** [Vergleich der geologischen Entwicklung des südlichen Afrika mit der des antarktischen Kontinents], *Academy of Sciences of the GDR. Central Institute for Terrestrial Physics. Publications,* 1986 No.87, 205p., In German with English, Russian, and Spanish summaries. Refs. p.160-205.

The geological development of southern Africa and Antarctica is described by diagrammatic maps of palaeogeographic and tectonic regimes through the period from Early Precambrian to Jurassic. The beginning of the break-up of the Gondwana Supercontinent is considered with respect to the possible former fitting of corresponding geologic structures of both continents. The best fit of Antarctica and southern Africa is realized in the juxtaposition of the coasts of Mozambique and Dronning Maud Land. In the western part of the suture the Falkland Plateau is inserted. The continuation of Archaean cratons of southern Africa onto the Antarctic continent can be deduced only indirectly by occurrences of corresponding epicratonic basins. Specific correlations are pointed out and discussed. Regionally, this area comprises Cape Range, Agulhas Bank, Weddell sector of Antarctica with the Pensacola and Ellsworth Mountains and the Falkland Plateau. Consistent with the folding of the Cape-Weddell tectogenesis which terminates in the Early Triassic period, a new pattern of sedimentation emerges. The former area of folding suffers uplifting and erosion. The bulk of the detritus is transported into the geosynclinal trough of the recent Antarctic Peninsula dominated by turbidity currents. Contemporaneously with Mesozoic folding near the active Pacific margin of the antarctic continent, basic magma ascends in Jurassic time in craton areas, particularly in southern Africa. (Auth. mod.)

E-35056

Grew, E.S., Manton, W.I., **New correlation of sapphirine granulites in the Indo-Antarctic metamorphic terrain: Late proterozoic dates from the Eastern Ghats Province of India,** *Precambrian research,* Sep. 15, 1986 33(1-3), p.123-137, 70 refs.

In reassemblies of Gondwanaland based on DuToit's original proposal, the Eastern Ghats Province is juxtaposed against a high-grade terrain in East Antarctica affected by a granulite-facies event and charnockitic plutonic activity 800-1100 Ma ago. The ages reported here suggest that a portion of the Eastern Ghats Province represents an extension of the late Proterozoic terrain from Antarctica into India. A review of sapphirine localities in the Indo-Antarctic metamorphic terrain indicates that sapphirine developed under a range of pressure-temperature conditions during the Archaean and Proterozoic. Evidence for a systematic change in peak metamorphic conditions with time is obscured by these regional variations. Characterization of the entire pressure-temperature path, in addition to estimates for the peak conditions, is needed to distinguish the Archaean and Proterozoic metamorphic regimes. (Auth. mod.)

E-35059

Williams, C.A., **Oceanwide view of Palaeogene plate tectonic events,** *Palaeogeography, palaeoclimatology, palaeoecology,* Oct. 1986 57(1), p.3-25, Refs. p.22-25.

In this review of current knowledge, the tectonic events taking place during the Palaeogene are discussed ocean by ocean. Three predominant periods of tectonic changes are determined, separating periods of continuous stable seafloor spreading. These periods of change occur at the Palaeocene-Eocene boundary 56-53 m.y., at the Eocene-Oligocene boundary 42-35 m.y. and during the early-middle Eocene 35-30 m.y. (Auth.)

E-35060

Shackleton, N.J., **Paleogene stable isotope events,** *Palaeogeography, palaeoclimatology, palaeoecology,* Oct. 1986 57(1), p.91-102, Refs. p.100-102.

The oxygen isotope record in Paleogene benthic Foraminifera shows that at the base of the Paleogene the ocean deep waters had a temperature of about 10 C, rising to about 12 C at the base of the Eocene and cooling between 51 Ma and 49 Ma to about 9 C. The most dramatic event occurred just after the Eocene/Oligocene boundary, at about 35.8 Ma, when ocean deep waters cooled by several degrees within 10,000-100,000 yr, probably in association with temporary glaciation in the antarctic region. Another more intense glacial event in Antarctica may have occurred later in the Oligocene, at about 31 Ma and a third near the top of the Oligocene at 24 Ma. In the marine carbon isotope record a very rapid negative excursion occurred precisely at the Cretaceous/Tertiary boundary. A recovery to unusually positive values in the Late Paleocene was followed by a second negative excursion close to the Paleocene/Eocene boundary that was even more extreme in magnitude although it was not as rapid. These major carbon isotope events permit very accurate stratigraphic correlation; there are many other smaller features in the carbon isotope record that will also prove useful for this purpose. (Auth.)

E-35062

Froggatt, P.C., **Exceptionally large late Quaternary eruption from New Zealand,** *Nature,* Feb. 19, 1986 319(6054), p.578-582, 48 refs.

A thick, widespread volcanic ash layer sampled from marine cores in the south Pacific and sub-Antarctic, has been identified using major and rare-earth element chemistry. It is the correlative of the airfall Mount Curl Tephra, the initial eruptive phase of the voluminous Whakamaru Ignimbrite from Taupo, New Zealand. Detailed oxygen-isotope analysis on the late Quaternary section of the core from Deep Sea Drilling Project Site 594, supplemented by other data, places Mount Curl Tephra within the glacial, Isotope Stage 8 and assigns an age of 254 kyr to the tephra. The airfall tephra covers at least 10,000,000 sq km with a minimum volume of 700 cu km. The Whakamaru Ignimbrite phase encompasses at least another 500-1,000 cu km. A combined volume of $>1,200$ cu km makes this Taupo eruption the largest in the Southern Hemisphere in late Quaternary times. Mount Curl Tephra is so widespread that the eruption possi-

bly caused disruption to the atmosphere and climate, and material from this eruption may be recognizable in sediments 10,000 km from the source. (Auth.)

E-35068

Garrett, S.W., Renner, R.G.B., Jones, J.A., McGibbon, K.J., **Continental magnetic anomalies and the evolution of the Scotia Arc,** *Earth and planetary science letters,* Jan. 1987 81(2/3), p.273-281, 39 refs.

Linear belts 50-100 km in width of long-wavelength positive magnetic anomalies exceeding 500 nT are observed on continental blocks of the Scotia Arc. The most developed is the West Coast Magnetic Anomaly which may be traced for more than 1300 km along the Antarctic Peninsula. Comparison of magnetic profile data after low-pass filtering and reduction to pole reveals a striking similarity between the individual anomaly belts. Correlation of the anomalies with positive gravity anomalies, seismic refraction data and geology indicates that the sources are linear batholiths intruded during Mesozoic/Cenozoic subduction. The anomaly belts are truncated at the block margins reflecting Cenozoic fragmentation of a cuspate convergent margin. An early Cenozoic reconstruction, based on the assumption that the batholiths once formed a continuous curvilinear feature, shows a good alignment of Mesozoic strato-tectonic terrains and is compatible with the known history of Scotia Sea opening. (Auth.)

E-35069

Martin, A.K., Patriat, P., Segoufin, J., **Comment on "Relative positions of Africa and Antarctica in the Upper Cretaceous: evidence for the non-stationary behaviour of fracture zones" by Ph. Patriat, J. Segoufin, J. Goslin, and P. Beuzart,** *Earth and planetary science letters,* Jan. 1987 81(2/3), p.312-318, Includes reply by Patriat and Segoufin. 14 + 5 refs. For the article being commented on, see 15E-32694.

Patriat et al have proposed a new Africa Antarctica reconstruction for the Upper Cretaceous based on fitting offset 32-34 anomalies in the Enderby Basin with offset anomalies 32-34 in the Mozambique Basin. Although they agree that the offset between mapped anomalies in the Mozambique Basin "falls almost perfectly in line with the present Prince Edward Fracture Zone", their reconstruction matches antarctic crust east of Prince Edward Fracture Zone (PEFZ) with Africa crust west of the PEFZ. They then use their reconstruction to conclude that fracture zones in the region are not stable features and that their locations have changed. Martin disagrees with their view, and Patriat and Segoufin re-affirm their original conclusions.

E-35075

Grikurov, G.E., Kaiser, G., Krylov, A.IA., Shulatin, O.G., **Age and geotectonic position of igneous rocks in the Kraul Mountains** [O vozraste i strukturnom polozhenii izverzhennykh porod v gorakh Kraul', zapadnaia chast' Zemli Korolevy Mod (Antarktida)], *Antarktika; doklady komissii,* 1984 No.23, p.41-45, In Russian. 10 refs.

DLC G576.A65

The overall geological structure of the Kraul Mountains is reviewed in the light of Norwegian and the authors' own investigations. On the basis of geochronological observations and their geological interpretation it is concluded that Mesozoic tholeiite magmatism in the Kraul Mountains probably occurred in three phases: Triassic, Jurassic, and Cretaceous.

E-35076

Solov'ev, I.A., Popov, L.E., Samsonov, V.V., **New data on Upper Cambrian fauna of Ellsworth and Pensacola Mountains** [Novye dannye o verkhnekembriĭskoĭ faune gor Elsuert i Pensakola (Zapadnaia Antarktida)], *Antarktika; doklady komissii,* 1984 No.23, p.46-71, In Russian. Refs. p.70-71.

DLC G576.A65

Organic remains described in this article belong to sponge spicules, trilobites, gastropods and brachiopods. Inarticulate brachiopods *(Lingullelinae, Angulitreta?, Dictyonia)* were found in the Heritage Range of the Ellsworth Mountains in a layer of Webers limestone formation together with trilobites from the *Aphelaspis (Labiostria) antarctica* layers, determining a significant biostratigraphic level of the Upper Cambrian. Spiculiferous sponges *(Protospongiidae, desmospongioidea),* gastropods *(Hypseloconidae)* and inarticulate brachiopods *(Dacylotreta solitaria sp.n.).* together with trilobites *(Proceratopyge, Olentella)* determine the Upper Cambrian Nelson's formation in the south of Neptune Range of the Pensacola Mountains. Detailed taxonomic and morphological descriptions of the specimens found, as well as numerous photographs, are presented.

E-35080

Konishchev, V.N., Moskalevskiĭ, M.IU., Artemova, N.L., **Mineralogy and morphology of disperse morainal debris on King George and Nelson islands** [Mineralogiia i morfologiia dispersnykh chastits morennogo materiala lednikov ostrovov King-Dzhordzh (Vaterloo) i Nel'son (Leĭptsig), Subantarktika], *Antarktika; doklady komissii,* 1984 No.23, p.104-110, In Russian. 5 refs.

DLC G576.A65

Discussed are results of granulometric and mineralogical analyses of morainal debris, showing evidence of cryogenic transformation of matter from glacier bedrock.

E-35081

Miagkov, S.M., **McMurdo Sound: neotectonics and glaciation** [Oazis Mak-Merdo: neotektonika i oledenenie], *Antarktika; doklady komissii,* 1984 No.23, p.111-118, In Russian. Refs. p.117-118.

DLC G576.A65

A detailed reconstruction of the history of sea level variations at McMurdo Sound during the antarctic glaciation of 25 m.y.a. is presented. Such variations reflected tectonic elevations in the region of no less than 2000 m, culminating in the glacio-isostatic pressure on the earth crust during maximum development of glaciation, 6-7 m.y.a. and 3 m.y.a., as well as fluctuations of global sea level. In the last 3 m.y., the mean velocity of the tectonic elevation is of about 0.15 mm/y, which is at present on the increase. It is pointed out that various hypotheses regarding the formation of the antarctic ice cover do not contain a historical record of altitude variations of the glacier bed.

E-35082

Shmideberg, N.A., Orlov, A.I., Edel'steĭn, K.K., **Hydrological and hydrochemical features of natural waters of Macquarie Island** [Gidrologo-gidrokhimicheskie osobennosti prirodnykh vod o. Makkuori], *Antarktika; doklady komissii,* 1984 No.23, p.119-132, In Russian. 13 refs.

DLC G576.A65

New data, as well as data obtained by New Zealand investigators in 1963, on morphometry and chemistry of freshwater lakes on Macquarie I. are presented. The sources of chemical components are identified with rock disintegration and organic remains.

E-35090

Hall, K., **Freeze-thaw simulations on quartz-micaschist and their implications for weathering studies on Signy Island, Antarctica,** *British Antarctic Survey. Bulletin,* Nov. 1986 No.73, p.19-30, 27 refs.

Results of two series of freeze-thaw simulations on quartz-micaschist indicate that there is a significant difference in the rate of freeze penetrating depending upon whether the plane of schistosity is normal or parallel to the advancing freezing front. Rate of fall of temperature is up to five times faster when schistosity is parallel to the freeze advance. In these simulations the rate of fall of temperature within the rock was controlled primarily by the amplitude of the freeze event rather than the environmental rate of fall of temperature. A distinction is made between open systems (e.g. cliffs) and closed systems (e.g. loose blocks) with respect to processes and rate of breakdown. It is suggested that, with the very low porosity of this rock, there is a difference in the freeze mechanism based upon schistosity orientation but that overall moisture content plays a crucial role in determining whether any frost weathering will occur. (Auth.)

E-35093

Moyes, A.B., Storey, B.C., **Geochemistry and tectonic setting of gabbroic rocks in the Scotia Arc Basin,** *British Antarctic Survey. Bulletin,* Nov. 1986 No.73, p.51-69, 44 refs.

The petrography, mineral and whole-rock chemistry of gabbroic rocks from within the extensional back-arc basin of South Georgia and the calc-alkaline Mesozoic magmatic arc of the Antarctic Peninsula indicate (i) there are some mineralogical and chemical similarities between the South Georgia gabbros and some of the gabbros within the west coast province of the Antarctic Peninsula and (ii) there are some mineralogical differences between gabbros that formed farthest from (east coast) and those that formed closest to the plate margin (west coast) within the Antarctic Peninsula arc. The chemical differences between the South Georgia gabbros and the majority of the Antarctic Peninsula gabbros suggest the gabbros were derived from different parental magmas controlled by tectonic features in the crust. On the other hand the chemical similarities between the South Georgia gabbros and some of the west coast gabbros indicate an extensional phase of arc development in the Antarctic Peninsula. (Auth. mod.)

E-35095

Truswell, E.M., Drewry, D.J., **Distribution and provenance of recycled palynomorphs in surficial sediments of the Ross Sea, Antarctica,** *Marine geology,* 1984 Vol.59, p.187-214, Refs. p.211-214.

Quantitative analysis of surficial sediments in the Ross Sea has shown that the highest densities of recycled palynomorphs occur in a region in the southeast, immediately north of the Ross Ice Shelf in the vicinity of Roosevelt Island. There, spores and pollen of Late Cretaceous to Early Tertiary age predominate. Eocene dinoflagellates and rare Paleozoic spores are also present. In the western half of the Ross Sea, densities of recycled palynomorphs are lower, but relative frequencies of Palaeozoic types are higher. On the continental shelf, the palynomorphs have been recovered, in equal abundance, from sediments identified as basal tills and compound glaci-marine sediments. Comparison of the observed patterns of distribution with patterns of ice flow in the Ross Ice Shelf shows a clear correlation between the high palynomorph densities in the southeastern Ross Sea and discharge from ice streams D and E. The observed patterns of palynomorph distribution reflect input from ice drainage areas in both East and West Antarctica. The preservation of sediments of differing provenance in distinct areas on the sea floor probably indicates processes of meltout of debris near the grounding line of the Ross Ice Shelf during past phases of expansion. Marine bottom currents have not significantly redistributed the recycled microfossils. (Auth. mod.)

E-35106

Black, L.P., Harley, S.L., Sun, S.S., McCulloch, M.T., **Rayner Complex of East Antarctica: complex isotopic systematics within a Proterozoic mobile belt,** *Journal of metamorphic geology,* Jan. 1987 5(1), p.1-26, Refs. p.23-25.

New isotopic and petrological data are presented for part of an extensive Proterozoic mobile belt (locally known as the Rayner Complex) in East Antarctica. Sm-Nd model ages of 1.65-2.18 Ga disprove a previously favored hypothesis that the Rayner Complex mostly represents reworked Archaean rocks from the neighboring craton (Napier Complex). Two episodes of Proterozoic crustal growth are identified, the later of which occurred between about 1200 Ma and 1000 Ma, and was relatively minor. Sedimentation took place only shortly before Late Proterozoic orogenesis. The multiphase history of the Rayner Complex has resulted in complex isotopic behavior. Three temporally discrete episodes of Pb loss from zircon have been identified, the earliest-two of which are responses to the c. 960 Ma and 540 Ma tectonothermal events. Fluid leaching was operative during the later event for there is a good correlation between degree of isotopic discordance and secondary mineral growth. There is ubiquitous evidence for the resetting of Rb-Sr total-rock isochrons. Even samples separated by up to 10 km fail to produce igneous crystallization ages. Minor mineralogical changes produced by the 540 Ma upper greenschist-facies metamorphism were sufficient to almost completely reset some Rb-Sr isochrons and to produce open system conditions on outcrop scale, at least in one location. (Auth. mod.)

E-35108

Grew, E.S., Hinthorne, J.R., Marquez, N., **Li, Be, B, and Sr in margarite and paragonite from Antarctica,** *American mineralogist,* Oct. 1986 71(9-10), p.1129-1134, Refs. p.1133-1134.

Peraluminous margarite and paragonite of retrograde origin in a staurolite- and corundum-bearing talc-tourmaline-phlogopite-chlorite schist from Mount Bernstein, northern Victoria Land contain 0.17 and 0.18 wt% Li_2O, 0.05 and 0.004% BeO, 0.02 and 0.31% BaO, and 0.26 and 1.3% SrO, respectively, by ion-microprobe analysis. In addition, only 0.01% F and 0.02-0.03% B_2O_3 and no Rb were found with the ion microprobe. This is the first report of significant amounts of Li and Sr in paragonite. The unusual compositions of the paragonite and margarite are attributed to their ability to incorporate Li released from breakdown of lithian staurolite and Sr made available during a retrograde metamorphic stage in a silica-undersaturated rock. (Auth. mod.)

E-35110

Volkman, J.K., Allen, D.I., Stevenson, P.L., Burton, H.R., **Bacterial and algal hydrocarbons in sediments from a saline antarctic lake, Ace Lake,** *Organic geochemistry,* 1986 10(4-6), p.671-681, Refs. p.680-681.

Hydrocarbon distributions in a sediment core from Ace Lake, a saline, meromictic lake in Vestfold Hills were studied. Hydrocarbons were abundant in most core sections particularly in near-surface samples, and the distributions were very complex. Major constituents were identified as phytane, 2,6,10,15,19-pentamethyleicosane, tetrahydrosqualene, a mixture of phytenes, cholesta-3,5-diene and fern-7-ene. Smaller amounts of sterenes and hopenes were also present. The predominance of the first 3 acyclic isoprenoids in sediments buried less than 30 cm is consistent with high populations of methanogenic bacteria known to be present. Phytenes were abundant in all core sections, and there was no relationship between their abundance and that of phytane which suggests that they were not

derived from methanogenic bacteria. Phytadienes were minor constituents at all depths studied. An unusual feature of some distributions was the high concentrations of fern-7-ene which was the major hydrocarbon in the 20-25 cm core section. Major changes in the hydrocarbon distributions with depth indicate that the depositional environment in the lake has altered dramatically since the lake was formed less than 8000 years ago. The present condition of permanent anoxic bottom waters probably developed only in the last 1000 years. (Auth. mod.)

E-35115

Borg, S.G., **Granitoids of northern Victoria Land, Antarctica: implications of chemical and isotopic variations to regional crustal structure and tectonics,** *American journal of science,* Feb. 1987 287(2), p.127-169, Refs. p.164-169.

In the pre-Devonian basement of northern Victoria Land two spatially and temporally different groups of granitoids are present, and each displays distinct and different compositional polarity. The Cambro-Ordovician Granite Harbour Intrusives (GHI) are confined to the Wilson Terrane (WT) and consist of various lithologies which are exclusively I-type in the east and predominantly S-type in the west. First order trend surface analysis of major and trace elements is compatible with increasing involvement of peraluminous metasedimentary (old continental crustal) material in production of GHI from east to west and supports an interpretation of GHI as a plutonic belt on the margin of the East Antarctic Craton (EAC). Nd and Sr isotopic data corroborate involvement of old material. The Devonian Admiralty Intrusives (AI) are found only in Bowers Terrane (BT) and Robertson Bay Terrane (RBT) and consist predominantly of I-type tonalites, granodiorites, and monzogranites. Pronounced compositional polarity (major and trace elements) indicates increasing involvement of old crustal material from south to north. Regular variations of initial Nd isotopes and Sr isotopes corroborate this interpretation. These data do not support a model of emplacement of AI in their present setting on the EAC margin. The isotopic compositions as well as the major and trace element characteristics of the two groups of granites indicate that a major discontinuity in the lower crust coincides with the boundary between WT and BT + RBT. (Auth. mod.)

E-35118

Takeda, H., **Mineralogy of antarctic ureilites and a working hypothesis for their origin and evolution,** *Earth and planetary science letters,* Feb. 1987 81(4), p.358-370, 46 refs.

Mineralogical and crystallographic data and electron microprobe analyses of silicate minerals for antarctic ureilites Y74123, Y74130, Y74659, Y790981, ALHA77257, ALHA78019 and ALH82106 extend the chemical and textural variations among ureilites beyond those known for non-antarctic ureilites. Low-Ca pyroxenes, possibly orthopyroxene, poikilitically enclosed in olivine and coexisting with Mg-rich pigeonites, have been identified in Y74659 and ALHA77257. Coexisting low-Ca pyroxene, pigeonite, and augite, together with the very Fe-rich olivine in ureilites were observed in Y74130. Almost Fe-free pigeonite and diopside coexist in ALH82106. No systematic differentiation trend has been reconstructed from these data, but the pyroxene pairs yield formation temperatures above 1200 C. A weak anticorrelation between MnO and FeO delineated by these pyroxenes suggests that a reduction reaction is responsible for the chemical variations. A working hypothesis for ureilite formation involves high-temperature episodes and a planetesimal-scale collision, which might have facilitated compaction and recrystallization of mafic silicates. During the episodes, Fe-Ni-S eutectic melt and a partial melt rich in Ca, Al and Fe might have been lost from a carbonaceous-chondrite-like source material.

E-35121

Zinderen Bakker, E.M. van, Mercer, J.H., **Major Late Cainozoic climatic events and palaeoenvironmental changes in Africa viewed in a world wide context,** *Palaeogeography, palaeoclimatology, palaeoecology,* 1986 Vol.56, p.217-235, Refs. p.231-235.

During the Late Cainozoic Africa witnessed big changes of a physical and biological nature. The climatic variations which occurred are reviewed in this article in a wider context, correlating them with events in other continents and their surrounding oceans. Indications of former connections between the ancient Gondwana lands, which included Africa and Antarctica, are examined. It is found that from the Eocene till the Middle Pliocene the climatic changes in Africa were linked with events in the antarctic region, and it is concluded that the oscillating climatic conditions—with alternating glacial and interglacial stages which affected the stability of the Antarctic Ice Sheet—must also have affected African habitats.

E-35128

Wharton, R.A., McKay, C.P., Mancinelli, R.L., Simmons, G.M., Jr., **Perennial N2 supersaturation in an antarctic lake,** *Nature,* Jan. 22-28, 1987 325(6102), p.343-345, 14 refs.

The results of a study which, for the first time, documents the supersaturation of N2 in a lake are reported. Dissolved N2 levels of 145% and 163% were determined from samples taken just below the ice cover and at a depth of 12 m, respectively. The relative importance of biological and abiological sources is reflected in the ratio of N2 concentration to O2 concentration. In Lake Hoare this ratio is 1.20 at the ice/water interface and 1.05 at 12 m; considerably different from the ratio in equilibrium with air (=1.8). Based on these results it is determined that about half of the net O2 production in the lake is the result of biological processes. (Auth. mod.)

E-35133

Black, L.P., James, P.R., Harley, S.L., **Geochronology, structure and metamorphism of Early Archaean rocks at Fyfe Hills, Enderby Land, Antarctica,** *Precambrian research,* Aug. 1983 21(3-4), p.197-222, Refs. p.219-222.

DLC QE653.P74

The Fyfe Hills of Enderby Land are composed of Archaean cratonic rocks of the Napier Complex. Initial crustal formation was in the early Archaean. At about 3100 Ma, the rocks underwent granulite facies metamorphism and an intense regional strain (D1) which rotated into parallelism pre-existing discordances and produced a recumbent gneissic pile. Subsequent ductile deformation (D2), also characterized by tight to isoclinal folding, produced characteristic microstructure—only within F2 folds, but no axial-plane foliation was developed. Peak granulite-facies metamorphic conditions close to 900 C and 9-11 kbars were reached during D1-D2. Considerable Pb loss occurred in zircon during asymmetric open to tight folding (D3) and upper amphibolite to granulite-facies metamorphism (650 C; 7 kbars) at 2500 Ma. Rb-Sr equilibration on the scale of centimeters occurred at that time, after which the Napier Complex was essentially cratonized. (Auth. mod.)

E-35140

Birkenmajer, K., Narebski, W., Nicoletti, M., Petrucciani, C., **Late Cretaceous through Late Oligocene K-Ar ages of the King George Island Supergroup volcanics, South Shetland Islands (West Antarctica),** *Polska Akademia Nauk. Bulletin. Série des sciences de la terre,* 1982 30(3-4), p.133-143, 25 refs.

The calc-alkaline island-arc volcanic suite of the South Shetland Is.—the King George Island Supergroup, represents a Late Cretaceous through Late Oligocene time span. At Admiralty Bay where the succession is most complete and best studied, the oldest radiometric

K-Ar whole-rock date 77 Ma (Santonian-Campanian) was obtained near the bottom, and the youngest date 24.5 Ma (Late Oligocene)—near the top of the succession. Still older dates, 79 to 106 Ma (Santonian-Albian) reported from Fildes Peninsula, Maxwell Bay may correlate with initiation of the subduction-controlled volcanic suite in that sector of the South Shetland Is. arc. (Auth.)

E-35155

Rees, M.N., Rowell, A.J., Pratt, B.R., **Byrd Group of the Holyoake Range, central Transantarctic Mountains,** *Antarctic journal of the United States,* 1985 20(5), p.3-5, 8 refs.

The objectives of the study in the Holyoake Range during the 1984-1985 austral summer were to determine the tectonic and depositional setting that produced the great thicknesses of Shackleton Limestone and Douglas Conglomerate, to improve the biostratigraphic control within the Shackleton Limestone, and to ascertain the relationship between the two formations. It is found that the Shackleton Limestone is composed of lithofacies that accumulated in numerous depositional environments. In addition to the archaeocyathids, the alga *Renalcis* occurs and *Epiphyton* is abundant. Shelly fossils are moderately common at several horizons. These include helicionellid molluscs, kutorginacean, and rare acrotretacean brachiopods, together with redlichacean and ptychopariacean trilobites. Preliminary examination of trilobites and brachiopods from the thin-bedded units indicates an entirely Early Cambrian age for all the formation. The relationship of the Douglas Conglomerate to the Shackleton Limestone in the northern part of the Holyoake Range strongly suggests that the Douglas Conglomerate is not a Cambrian formation. It postdates at least one phase of intense folding of the Shackleton and the subsequent uplift and development of a karst surface on the limestone.

E-35156

Taylor, T.N., Smoot, E.L., **New Triassic cycad from the Beardmore Glacier area of Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.5-7, 6 refs.

The anatomy of several silicified stems of fossil cycads collected from the Fremouw Peak in the Beardmore Glacier area is described in detail. Illustrations of transverse section of the stems and dichotomizing root are presented. All of the structurally preserved cycad stems including the Tertiary genera *Borora* (Archangelsky, Petriella, and Romero 1969) and *Menucoa* (Petriella 1969) are remarkably similar anatomically to modern cycads. The specimens from Antarctica currently represent the oldest anatomically preserved cycad stems. The similarity of anatomical features shared by the Triassic and extant forms suggests a relative evolutionary stasis within the Cycadeles.

E-35157

Stubblefield, S.P., Taylor, T.N., **Fossil fungi in antarctic wood,** *Antarctic journal of the United States,* 1985 20(5), p.7-8, 5 refs.

Silicified specimens of gymnospermous wood collected from two localities near the Beardmore Glacier illustrate a type of fungal decay that is seldom found in the fossil record. One site is located at Fremouw Peak within the Upper Beacon Supergroup and is regarded as Triassic in age (Barrett 1970). The second locality is considered to be middle or late Permian and is located at Mount Augusta. Illustrations of specimens of *Araucarioxylon*-type wood and axes of *Vertebraria* possessing numerous perforate areas that are the result of extensive fungal activity are shown. In transverse section, the decayed areas (pockets) appear circular-irregular in outline; in longitudinal section these areas of disrupted tissue are somewhat spindle-shaped. Fungi are represented by vegetative hyphae that may be present in the pockets, as well as in tracheids and ray parenchyma cells. When compared with the activities of modern fungi, the pattern of these woods in Antarctica is similar to extant whitepocket rots that are caused by members of the Basidiomycotina.

E-35158

Pigg, K.B., Taylor, T.N., **Anatomically preserved *Glossopteris* from the Beardmore Glacier area of Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.8-10, 2 refs.

Numerous silicified specimens of *Glossopteris* have been identified in petrified peat collected from the Mount Augusta locality in the Beardmore Glacier area (Schopf 1970). This material provides a unique opportunity to investigate the anatomy and morphology of *Glossopteris* leaves and to compare the structurally preserved specimens with those taxa reported from the more commonly occurring impression/compression specimens. Specimens are analyzed by examining morphological features of the leaves that occur on split or weathered surfaces and preparing closely spaced, serial sections for histological examination. Illustrations of the transverse sections are presented. The examined material shows marked histological differences when compared to the structurally preserved leaves from Bowen Basin.

E-35159

Cherry, E.M., Noltimier, H.C., **Dating till by paleomagnetism: Allan Hills, southern Victoria Land,** *Antarctic journal of the United States,* 1985 20(5), p.10, 4 refs.

A single oriented block sample of Sirius Formation till was collected for paleomagnetic analysis from Manhaul Bay in the Allan Hills during the 1980-1981 austral summer. This till sample is poorly indurated and contains subangular to subrounded fragments of sandstone, shale, and coal derived from the local bedrock. The general composition and particle-size distribution is consistent with samples from the Allan Nunatak. Five of the cores exhibit reversed polarity and one has normal polarity. The single core with normal polarity has been rejected; the magnetization of this sample is interpreted to result from the incorporation of a strongly magnetized rock fragment with a random orientation. The magnetization of the reversed group is interpreted as a primary detrital remanent magnetization acquired at the time of deposition, implying that this deposit has a minimum age of 0.69 million years (Matuyama Reversed Epoch) and excludes other normal polarity intervals of the late Cenozoic.

E-35160

Faure, G., Taylor, K.S., **Geology and origin of the Elephant Moraine on the east antarctic ice sheet,** *Antarctic journal of the United States,* 1985 20(5), p.11-12, 2 refs.

The Elephant Moraine is located on the east antarctic ice sheet about 80 km northwest of the Allan Hills. For 6 weeks during the 1984-1985 austral summer, fieldwork was conducted in the Elephant Moraine to prepare a geologic map of the moraine and to explain its origin. The geological mapping was done by classifying 47,687 clasts at 230 surveyed positions in the moraine. The results indicate that clasts having diameters greater than 16 mm are composed primarily of dolerite, basalt, sandstone, diamicton, and siltstone with minor amounts of till pellets, chert, black shale, black calcite, and coal. Clasts were seen within the ice at many locations. Excavations of these clasts suggest that they are aligned along flow lines of the ice which intersect the surface at about 40 deg. This observation, combined with the observed ablation rate, permits an estimate of the age of the Elephant Moraine. The calculation is based on the assumptions that the ablation rate is approximately equal to the vertical iceflow velocity component and that the age of the moraine is given by its length divided by the horizontal velocity component. On this basis, the age of the Elephant Moraine is approximately 30,000 years.

E-35161

Faure, G., Sutton, S., **Thermoluminescence of sandstone clasts of the Elephant Moraine,** *Antarctic journal of the United States,* 1985 20(5), p.12-14, 2 refs.

Reported here are the initial results of thermoluminescence measurements on three clasts from different locations within the Elephant Moraine. Sandstone clasts were collected from the "little moraine" which lies just east of the main Elephant Moraine body. This segment of the moraine appears to be forming as clasts emerge from ice at its southern end and travel northward as the ice sheet flows. Thus, clasts found at the southern end of the moraine are expected to have experienced less sunlight exposure than those at the north end. Three sandstone clasts at different distances from the present southern tip have been measured. Initial results strongly suggest that sunlight has increased the thermoluminescence of sandstone clasts within the Elephant Moraine.

E-35162

Layman, D.E., Ervin, C.P., **Magnetic model studies of volcanic cones in the ice-free valleys of southern Victoria Land,** *Antarctic journal of the United States,* 1985 20(5), p.14, 2 refs.

Ground magnetic profiles were made across 11 volcanic cones in the Taylor and Wright Valleys region. The objective of the ground survey was to look for the presence of "feeder pipes" that might be the source of the outcrop. While many of the profiles exhibited the highly fluctuating field commonly encountered in association with surface volcanics, some of the profiles had fields of sufficient regularity to suggest the presence of deeper, more coherent sources; the best three of these were selected for model analysis. The first model was constructed for a 200 gamma anomaly in Wright Valley. The second cone modeled was on the side of Taylor Valley, next to Sollas Glacier. The profile adjacent to the Meserve Glacier revealed the most interesting model. The cone is located on the west side of the glacier. The model indicates the presence of multiple intrusions, with normally polarized rocks in the northern part of the outcrop and reversely polarized rocks in the southern part. In addition, the model indicates a single feeder for the southern rocks, but two channels for the northern rocks.

E-35163

Elston, D.P., Rieck, H.J., Robinson, P.H., **Dry valleys/McMurdo Sound magnetostratigraphy and sedimentology project: a progress report,** *Antarctic journal of the United States,* 1985 20(5), p.15-17, 12 refs.

It is reported that 12 Winkie core holes, up to 70 m in depth and totaling 485 m of cored section, have been drilled to date along the length of Taylor Valley for the development of detailed stratigraphic, paleomagnetic and sedimentologic data, supplemented by paleontologic information provided by other workers. Paleomagnetic studies, which include the determination of susceptibility and magnetic fabric as well as remanence, are being carried out. Lithostratigraphic and paleomagnetic correlations supported by sedimentologic and paleontologic data are being developed, but correlations are not yet final. Future drilling plans are outlined, with the objective of documenting in detail multiple incursions of the Ross ice sheet suggested from previous drillings. Barnacle and bivalve fragments found in the core near the bottom of hole ETV-10 provide a tentative maximum age for the fossiliferous beds in that hole. A Late Pliocene or Early Pleistocene age for the strata is suggested.

E-35164

Layman, D.E., **Physical properties of Cenozoic rock, McMurdo Sound region,** *Antarctic journal of the United States,* 1985 20(5), p.18, 2 refs.

Density, magnetic susceptibility, and compressional-wave velocity have been determined for 47 hand samples taken from the McMurdo Sound region. The samples included McMurdo volcanics, lower crustal xenoliths found in the volcanics, and Cenozoic sedimentary rocks. Susceptibilities were also determined for 38 additional volcanic samples. Velocities for 15 volcanic samples ranged from 1,938 to 4,840 m/s. Attempts to determine velocities for the xenoliths were unsuccessful. Velocities for the Cenozoic sedimentary rocks ranged from a low of 1,024 m/s to a high of 4,766 m/s. The volcanics exhibited the highest magnetic susceptibilities, ranging from 0.0002 to 0.008 cm-g-s units.

E-35165

Malin, M.C., **Rates of geomorphic modification in ice-free areas, southern Victoria Land, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.18-21, 5 refs.

Continuing research on the nature and rates of geomorphic processes in ice-free areas of southern Victoria Land concentrated during the 1984-1985 austral summer on recovering samples from 11 sites established the preceding year. Over 600 abrasion targets and 240 sand-trap specimens were recovered after exposure for 1 year. Significant damage to sand collectors and visible abrasion of targets at several sites attest to strong winds of consistent but short duration. Calculations suggest free-stream wind speeds approaching 70 m/s. Results confirm wide range in year-to-year variation: maximum annual abrasion determined from a 407-day exposure was approximately 0.05 mm for basalt, 0.10 mm for dolerite, and 3.70 mm for the nonwelded tuff. The differences between the 2 year-long exposures in the amount of sand collected from each of four directions (as a function of height) and the similar differences in the amount of abrasion of the tuff is shown. The survey of 6 ripple fields in an area within the north central portion of the Allan Hills is also discussed. An aerial view of a protion of one field of ripples shows the ripples to be about 30 cm in amplitude and to exist as isolated deposits resting on bedrock. The wavelength/amplitude relationship for representative fields of ripples in the Allan Hills, and at 2 additional sites, is also shown.

E-35166

McGinnis, L.D., Kim, Y., **Deep seismic soundings along the boundary between East and West Antarctica.,** *Antarctic journal of the United States,* 1985 20(5), p.21-22, 4 refs.

The seismic reflection data collected during the 1982-1983 and 1983-1984 seasons has been processed. The profile from 1982-1983 season data is characterized by abnormally strong multiples and highly irregular seafloor bathymetry to a distance of 25 km from Ross Island. The irregularity in the seafloor is believed to have been caused by glacial modification. Sideswipe from the McMurdo Sound Ice Shelf and Ross I. are also observed especially near Ross I. Additional noise below 7 seconds is attributed to flexural waves travelling through sea-ice. Strong multiples are due to unusually high velocity seafloor sediments (2.1 to 2.5 km/s). Results of this study suggest that the Victoria Land basin, Transantarctic Mountains, and Wilkes Subglacial Basin are parallel lineaments extending the length of the mountains which formed as a result of crustal thinning and extension.

E-35167

Berg, J.H., Hank, R.A., Kalamarides, R.I., **Petrology and geochemistry of inclusions of lower crustal basic granulites from the Erebus Volcanic Province, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.22-23, 3 refs.

Lower crustal basic granulites were collected from more than 15 Cenozoic volcanic centers in the McMurdo Sound/Royal Society Range region. Approximately one-half of the sampled volcanic centers are in the uplifted (up to 4,000 m) Transantarctic Mountains (TM) and the other half are in the low-lying Ross embayment (RE) where all crustal rocks other than the Cenozoic volcanics are below sea level. Although the inclusion suites from both regions are gabbroic in composition, they display striking differences in terms of

phase equilibria and isotope geochemistry. The preliminary conclusions are: the crust under the TM is much thicker than under the RE. Although the impressive topographic discontinuity along the boundary between the TM and RE is a recent development, which apparently reflects a simple subvertical faulting relationship, the lower crustal geochemical differences across this boundary suggest that the current faulting may coincide with an older crustal suture.

E-35168

Leung, I.S., Treves, S.B., **Fluid inclusions in olivine in a basanite flow from Ross Island, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.23-25.

During 1973, 3 holes were drilled on Ross I. in the late Cenozoic volcanic rocks. Boreholes 2 and 3 penetrated a 44-m-thick basanite flow at a depth of about 110 m below the surface, which is about 60 m below sea level. The top and base of the flow are scoriaceous and fragmental, and the rocks range in color from black to red. Fluid inclusions in the olivine described are from this unit. Abundant carbon dioxide inclusions as well as silicate-melt (glass) inclusions are found in olivine some of which even contain water solution or dense mixture of gases. The large inclusions are sparsely distributed at random. These are primary inclusions trapped during crystallization. Secondary inclusions are most abundant and usually very small, occurring along healed fractures. Melt inclusions exposed on polished sections prepared for electron microprobe analysis have been examined under high magnifications in a scanning electron microscope equipped with an X-ray energy-dispersive spectrometer. Results of this study indicate that there is direct correlation between increasing degree of crystallization in the included melt globule and depletion of silicon, concomitant with enrichment of iron in the residual melt.

E-35169

Kienle, J., **Eruption of Mount Erebus and Ross Island seismicity, 1984-1985,** *Antarctic journal of the United States,* 1985 20(5), p.25-28, 12 refs.

A convecting lake of molten anorthoclase phonolite lava occupied an inner pit crater on Mt. Erebus, which was observed every year since 1973. Dramatic changes occurred in this unique magmatic system just before the 1984-1985 austral summer. The steady-state convection of magma observed for nearly 12 years apparently slowed or stopped, possibly due to an overall cooling of the system, and the surface of the lake crusted over. Free gas flux from the glowing lava lake surface was inhibited, and the gas started to become trapped under the solidified crust. Since Sep. 13, 1984, this trapped gas has been released in rather violent explosions. Much of the ejecta was thrown to the north through a low saddle in the crater rim, blanketing the outer slope of the volcano with black bombs. Analysis of the volcanic glass of the bombs showed the same chemical composition as was found for bombs ejected prior to Sep. 1984, indicating that no new melt is involved in the current activity and that only a physical change of the plumbing system (cooling and possible choking of the convection cell) may be responsible for the present activity. Ross I. events located in 1984, and a comparison of the real locations and the computer locations of the calibration explosions, are illustrated.

E-35171

Haban, M.A., Elliot, D.H., **Mineral chemistry of the Kirkpatrick Basalt, northern Victoria Land,** *Antarctic journal of the United States,* 1985 20(5), p.30-31, 10 refs.

Electron microprobe data have been obtained for plagioclase, pyroxene and opaque grains, and volcanic glass in tholeiitic rocks of Mesa Range. The objective was to investigate the chemistry of the minerals and use the data for modelling possible paths of evolution within the low-titanium rocks and between the low- and high-titanium rocks. The plagioclase compositions are illustrated. The most notable feature of these plagioclase grains is the high anorthite (An) content which in some cases is more than An90. The pyroxene data are plotted. The calcium-rich pyroxenes in the low-titanium rocks are, in general, high magnesium/iron augites with a scattering of more iron-rich augites and subcalcic augites. The calcium-poor pyroxenes include both orthopyroxene and pigeonite. The mineral data for the Mesa Range rocks have been used to model the evolution of the magmas. Major element modelling suggests that the low-titanium flows are related to the sills by the fractional crystallization of plagioclase, augite, pigeonite, and titanomagnetite.

E-35173

Ellerman, P.J., LeMasurier, W.E., McIntosh, W.C., **Alteration of antarctic hyaloclastites,** *Antarctic journal of the United States,* 1985 20(5), p.33-34, 6 refs.

In this study, samples were collected from Ross I., Marie Byrd Land, and northern Victoria Land. The original composition of the rock varies from alkali olivine basalt to trachyte. Ages range from 2 million years to less than 1 million years old. Hyaloclastite samples encompass a large range in clast size, sorting, vesicularity, original porosity, and percentage of crystal or lithic fragments. Some of the samples are pillow breccias; some shallow water deposits, transitional to subaerial, contain accretionary lapilli. Phillipsite forms early and is found in nearly every sample. Electron microprobe analyses of glass fragments were performed to determine the chemical variation from the relatively fresh glass in the center of the shard to the palagonitized rim. Preliminary results indicate silicon, aluminum, sodium, and magnesium are lost by the glass and gained by the palagonite which is conspicuously hydrated relative to the glass. The distribution and paragenesis of the alteration minerals in the upper, palagonitized section at Castle Rock suggest their formation was largely controlled by increasing pH resulting from progressive dissolution of basaltic glass. The presence of early formed phillipsite and the persistence of relatively fresh glass in many of the antarctic hyaloclastite samples unrelated to age, suggest that following initial palagonitization and authigenic mineral formation, diagenesis proceeds slowly due to reduction in porosity and available exposed glass and to the relative lack of free water in the antarctic environment.

E-35174

Rowley, P.D., Kellogg, K.S., Vennum, W.R., **Geologic studies in the English Coast, eastern Ellsworth Land, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.34-36, 12 refs.

The first visit to the previously unexplored English Coast of the Bellingshausen Sea was made during the 1984-1985 austral summer. The field party completed reconnaissance geologic mapping of rocks exposed in nunataks scattered over about 16,000 sq km; it also studied rocks in the Behrendt Mountains and other nearby parts of eastern Ellsworth Land that had not been mapped before. Most exposures in the English Coast consist of calc-alkaline volcanic rocks deposited subaerially along the axis of the magmatic arc. The volcanic rocks either overlie or occur interbedded with continental sedimentary rocks of several ages near the axis of the magmatic arc. Most sedimentary rocks appear to intertongue with the volcanic rocks and thus are part of the magmatic arc assemblage as a continental variety of the Latady Formation. A third variety of continental sedimentary rock was found to contain *Glossopteris* flora. This third type of sedimentary rocks, which are exposed only at a small nunatak west of Henkle Peak, argues for late Paleozoic or Triassic basement rocks underlying the magmatic arc in the English Coast.

E-35175

O'Neill, J.M., Thomson, J.W., **Tertiary mafic volcanic and volcaniclastic rocks of the English Coast, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.36-38, 7 refs.

Geologic mapping of the English Coast revealed that a linear chain of nunataks and mountain peaks, Snow Nunataks, is composed

of interlayered basaltic flow rocks, hyaloclastites, pillow basalts, and locally thick accumulations of volcaniclastic sedimentary deposits, probably derived in large part from the nearby mafic volcanic centers. A rounded, ice-capped peak, Mount McCann, exhibits nearly 300 m of relief on the north face, where rock exposure is continuous. The lower 200 m consists of massive basalt flows composed mainly of ellipsoidal, subspherical, and mushroom-shaped basalt pillows ranging in diameter from 0.3 to 2 m. The pillow basalts are capped by 1 to 5 m of massive orange-brown hyaloclastite, strongly altered to palagonite, which contains abundant angular olivine basalt clasts 1 to 30 cm in diameter; where preserved, the upper 2 m of the hyaloclastite is well bedded. Mount Thornton, very nearly the same size and shape as Mount McCann, also is an ice-capped peak with rock exposed only on the north side. The rocks consist of principally orange-tan hyaloclastite, strongly altered to palagonite, that appears to overlie poorly exposed olivine-bearing pillow basalts and blocky flows of unknown thickness. The east end of Snow Nunataks is marked by Mount Benkert. The lower part of the layered rocks is exposed at the eastern end of Mount Benkert and consists of a subhorizontal succession of hyaloclastite interbedded with pillow lava and pillow breccia.

E-35176

Laudon, T.S., Lidke, D.J., Delevoryas, T., Gee, C.T., **Sedimentary rocks of the English Coast, eastern Ellsworth Land, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.38-40, 9 refs.

Sixteen small nunataks or nunatak groups scattered over more than 16,000 sq km of the English Coast of the Bellingshausen Sea in eastern Ellsworth Land were examined for the first time during the 1984-1985 field season. Small outcrops of sedimentary rocks occur at 9 localities. The sedimentary rocks have been structurally deformed and most have northwesterly strikes and southwesterly dips. All of the sedimentary rocks appear to have been deposited in terrestrial environments, some of Late Paleozoic or Triassic age. Deltaic or coastal swamp environments seem to be represented by fine-grained sandstone containing *Glossopteris* leaves at "Erehwon" Nunatak, and by carbonaceous conglomerate and sandstone, containing abundant conifer wood, bark, and leaves, at Henkle Peak, which include leafy twigs of *Elatocladus* sp. probably of Jurassic age. It is suggested that the English Coast may have been located on or near the Pacific Coast of southern Gondwana during, or immediately prior to, the inception of the Gondwana breakup during the Triassic.

E-35177

Dalziel, I.W.D., Pankhurst, R.J., **Tectonics of West Antarctica and its relation to East Antarctica: USARP-BAS geology/geophysics project (1984-1985),** *Antarctic journal of the United States,* 1985 20(5), p.40-41.

The joint U.S. Antarctic Research Program-British Antarctic Survey (USARP-BAS) geology and geophysics project was initiated in 1980-1981 and continued in 1983-1984 and in 1984-1985. The work comprised detailed field studies of the Mesozoic igneous basement and Tertiary volcanic cover rocks of the Jones Mountains and of the igneous and metamorphic rocks of Thurston Island and adjacent islands and of Lepley Nunatak. Basic field observations were undertaken by the whole party including detailed structural observations in the metamorphic rocks. Extensive collections were made for major and trace element geochemical analysis and for isotope geochemical studies. 780 cores and several oriented hand specimens were collected, constituting 120 sites for paleomagnetic studies.

E-35178

Zinsmeister, W.J., **1985 Seymour Island expedition,** *Antarctic journal of the United States,* 1985 20(5), p.41-42, 3 refs.

The third major field expedition to Seymour Island reported here was carried out during Feb. and Mar. 1985. Despite poor weather conditions a number of important paleontologic discoveries were made, and important new stratigraphic data concerning the Cretaceous/Tertiary boundary obtained. The highlights of the 1984 field season are summarized.

E-35179

Marvin, U.B., Post, J., **Searching for evidence of an impact event at the Cretaceous/Tertiary boundary on Seymour Island,** *Antarctic journal of the United States,* 1985 20(5), p.42-43, 11 refs.

At more than 50 sites worldwide, anomalously high values of iridium and other siderophile elements have been detected in sediments marking the Cretaceous/Tertiary boundary. These high values have been ascribed to meteoric contamination in an impact dust cloud. Using several coring tools and retrieval methods and a variety of instruments for petrographic analyses of samples collected in a distinctive bed of glauconite greensand and a higher bed, this field party sought to identify the boundary on Seymour Island. Preliminary analyses produced no spheroids or other evidence of contact but more detailed laboratory analyses will be conducted.

E-35180

Zinsmeister, W.J., **Unusual occurrence of nautilids from the Upper Eocene La Meseta Formation, Seymour Island,** *Antarctic journal of the United States,* 1985 20(5), p.43-44, 6 refs.

A brief explication is presented of the occurrence of nautilid fossils on Seymour Island. Although it is common to find nautilids at most sites, generally only a few specimens are encountered and these in small numbers. This unusual occurrence of large numbers is of added importance since marsupial remains are thought to be preserved in this area. The nautilids' preferred habitat is at the 150-300 m depth; finding them on the beach in large numbers, broken and abraded, suggests that high energy wave and current action stranded them on the beach, probably during a single event rather than an accumulation with time.

E-35181

Askin, R.A., **Palynological studies in the James Ross Island basin, Antarctic Peninsula: a progress report,** *Antarctic journal of the United States,* 1985 20(5), p.44-45, 9 refs.

Six informal palynological zones are recognized in the uppermost Cretaceous of southern Seymour Island and surrounding region in the James Ross Island basin, northeastern Antarctic Peninsula. These zones are, at present, based mainly on dinoflagellate cyst species. Zones 4 through 6 are defined primarily on an apparent evolutionary lineage of *Isabelidinium* species, therefore the zonal boundaries are somewhat transitional. Key angiosperm pollen species, although sometimes rare, permit additional resolution in the zonation. The diagnostic species, distribution, correlation, and age of these zones are noted briefly.

E-35182

Barbis, F.C., **Reconnaissance geology, Robertson Island and Jason Peninsula, northern Antarctic Peninsula,** *Antarctic journal of the United States,* 1985 20(5), p.45, 1 ref.

During a 1983/84 unscheduled reconnaissance trip south along the east side of the Antarctic Peninsula, a section was measured and sampled for palynological study at Robertson Island. At Jason Peninsula, further south, several samples of hydrothermally altered volcanic rock were collected. The hydrothermal alteration consists of extensive fine-grained secondary quartz, up to 1.3 cm thick, in fractures; and quartz crystals, up to 4 mm, lining vugs in the rock. Iron staining was also obvious. Due to the similarity of this alteration

to gold and silver occurrences in the western United States, a geochemical analysis (atomic absorption) for gold and silver was performed on one of these samples. No gold or silver was detected.

E-35183
Huber, B.T., **Location of the Cretaceous/Tertiary contact on Seymour Island, Antarctic Peninsula,** *Antarctic journal of the United States,* 1985 20(5), p.46-48, 6 refs.

Given the present biostratigraphic data, there are three alternative locations for the Cretaceous/Tertiary contact on Seymour Island. First, the contact could be placed at the glauconite bed, 50 m below the base of the Sobral Formation. A second possible location of the Cretaceous/Tertiary contact is placement at the disconformable contact of the Lopez de Bertodano and Sobral Formation. Finally, the Cretaceous/Tertiary contact may occur at some other, as yet undefined, horizon between the highest ammonite level in the uppermost Lopez de Bertodano Formation and the level of the first Paleocene silicoflagellates in the lowermost Sobral Formation. Arguments and the evidence, deductions, and assumptions on which these arguments are based for each of the locations are given and credibilities are implied.

E-35184
Taylor, T.N., Smoot, E.L., **Plant fossils from the Ellsworth Mountains,** *Antarctic journal of the United States,* 1985 20(5), p.48-49, 6 refs.

The majority of plant remains come from a single locality in the Polarstar Formation (east ridge of Polarstar Peak; 86 deg 10 W 77 deg 32 S), and an analysis of these will form a component of a volume on the Ellsworth Mountains. The study will not only describe and illustrate the floral elements but will also compare the plants with other Gondwana floras. The specimens come from six stratigraphic levels within a measured section 350 m thick. The plant remains are preserved as impressions in a poorly bedded, dark gray to black argillite. More than 20 major floral elements have been identified.

E-35185
Webers, G.F., Splettstoesser, J.F., **Volume on geology of the Ellsworth Mountains—progress in 1984-1985,** *Antarctic journal of the United States,* 1985 20(5), p.50, 2 refs.

The volume in preparation has undergone a transition from the data reduction and material processing stage to preparation and submittal of final manuscripts. Submission to the Geological Society of America is expected in mid-1985 with printing following in 1986. A highlight of the volume will be a colored geologic map, scale 1:250,000, of the entire Ellsworth Range.

E-35186
Drinkwater, J.L., Ford, A.B., Czamanske, G.K., **Study of sulfide mineral distribution in the Dufek intrusion,** *Antarctic journal of the United States,* 1985 20(5), p.50-51, 14 refs.

The occurrence and distribution of sulfide minerals in the layered gabbroic Dufek intrusion are investigated in preparation for mineralogical studies by electron-microprobe analysis. Studies of cumulus pyroxenes and oxides and plagioclase show compositional (fractionation) trends generally comparable to those of other differentiated layered mafic intrusions. Presently little-studied sulfide minerals include pyrite, pyrrhotite, and chalcopyrite. This study was made by reflected-light examination of approximately 2,300 standard thin sections representing all lithologies from throughout the exposed layered sequence. Sulfide amounts were estimated and ranked as "trace" (less than 0.1 percent), "minor" (.01 to 0.5 percent), and "major" (greater than 0.5 percent). Samples containing largest amounts were point counted for greater accuracy. The geological structure of the study area is briefly noted and sulfide occurrences are described generally and as they appear in the Dufek Massif and in the Forrestal Range. Discussion of the sulfides centers on their formation, stratigraphic position, and comparison with the Bushveld Complex of South Africa.

E-35187
Grew, E.S., **Field studies on the Jetty Peninsula (Amery Ice Shelf area) with the 30th Soviet Antarctic Expedition,** *Antarctic journal of the United States,* 1985 20(5), p.52-53, 9 refs.

The writer's field work as an exchange scientist with the Soviet Antarctic Expedition is part of a petrologic study of metamorphic rocks. The area of study contains exposed shield rocks, Permian sediments, mafic dikes, alkalic ultramafic dikes, and breccia pipes. The structures of these features are described, various rocks are identified, minerals found are noted, trends in dikes and pipes are given, and the richness of the Permian sediments is delineated.

E-35188
Cassidy, W.A., Schutt, J., **Antarctic search for meteorites: field program 1984-1985,** *Antarctic journal of the United States,* 1985 20(5), p.54.

The search areas in this program are the Elephant Moraine, four sub-units of Allan Hills, Battlefield Nunatak, Trinity Nunatak, and Odell Glacier. The latter three areas produced no meteorites. At Elephant Moraine and Allan Hills, 234 bits of ordinary chondrite were found along with 34 of carbonaceous chondrite, 21 achondrite, 1 iron, and 2 stoney iron for a total of 292 pieces. Even though the areas have been previously searched, it is expected that meteorites will continue to be found because the pieces are small and easily hidden by irregularities in the ice.

E-35189
Lipschultz, M.E., **Meteorite studies: terrestrial and extraterrestrial applications, 1985,** *Antarctic journal of the United States,* 1985 20(5), p.55-56, 8 refs.

Radiochemical neutron activation and atomic absorption techniques are used to determine parts-per-million/parts-per-billion levels of 12 to 15 chalcophile, lithophile, siderophile, and volatile/mobile trace elements in each meteorite studied to establish extraterrestrial and terrestrial history. During the past year, the following aspects were studied: formation conditions of meteorites of rare or unique type, the ice sheet's role in collecting extraterrestrial material and the nature of that material, and the detailed antarctic weathering processes in meteorites. These research elements are discussed and some details are given of the analytical processes using linar fragments as examples whose origins and histories are explained. Possible reasons why there are so many rare or unique meteorites in Antarctica are also explained. These include weathering, more highly inclined orbits of parent bodies, and temporal meteorite flux change.

E-35190
McIntosh, W.C., LeMasurier, W.E., Ellerman, P.J., Dunbar, N.W., **Re-interpretation of glaciovolcanic interaction at Mount Takahe and Mount Murphy, Marie Byrd Land, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.57-59, 6 refs.

Mount Takahe and Mount Murphy were reexamined in greater detail during the 1984-1985 austral summer by a snowmobile-equipped team of four geologists and two mountaineers. Outcrops representing the basal and upper portions of each volcano were visited. New field observations suggest that the former interpretation of 2,000-m fluctuations in ice-sheet level was too large. Instead, strong evidence was found that, during the eruptive histories of these volcanoes, ice-level fluctuations reached elevations only 350 to 400 m above the present surface of the west antarctic ice sheet. This paper addresses only ice-level changes that occurred during the eruptive

histories of these volcanoes; larger ice-level fluctuations may have occurred before or after the volcanoes formed.

E-35191

Denton, G.H., Stuiver, M., Austin, K.G., **Radiocarbon chronology of the last glaciation in McMurdo Sound, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.59-61, 6 refs.

From data collected at lakes in the Taylor Valley region two models are being tested to provide a chronology of lake level fluctuation. Lake levels in nearby valleys should show similar fluctuations to those of glacial Lake Washburn by the first but not necessarily by the second model. Further, the first model predicts that rises in the level of glacial Lake Washburn should accompany Ross Sea advance, whereas the second model predicts lake-level rise coincident with ice retreat. This new model implies that summer temperatures warmer than today's characterized Taylor Valley for several intervals of high lake levels during the last global glaciation. By either model, lake levels in the Fryxell basin higher than the valley-mouth threshold and in the Bonney basin higher than the mid-valley threshold both demand a thick Ross Sea ice dam. A table shows that such high lake levels all occurred between 23,800 and 11,820 years ago in late Wisconsin time. Available radiocarbon dates are in agreement with these results.

E-35192

Prentice, M.L., Wilson, S.C., Bockheim, J.G., Denton, G.H., **Geologic evidence for pre-late Quaternary east antarctic glaciation of central and eastern Wright Valley,** *Antarctic journal of the United States,* 1985 20(5), p.61-62, 6 refs.

There is good evidence from geological indicators such as basal till outcrops, Vida granite, Ferrar dolerite, molding of bedrock, and striated boulders that the flow of the depositional ice was from west to east. Comparisons are made between model expectations and what was actually found; significant differences and similarities between the two are discussed.

E-35202

Domack, E.W., **Glacial erosion on the George V/Adélie continental margin, East Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.76-78, 19 refs.

The only *in situ* occurrence of preglacial strata on the continental shelf comes from a lower Cretaceous siltstone recovered during austral summer 1978-1979—or Deep Freeze 79 (DF-79)—from the seaward flank of the Mertz-Ninnis Trough. Presented herein are additional data from this and other austral summer 1978-1979 cores which suggest that up to 2,000 m of preglacial section may have existed at one time within the present area of the Mertz-Ninnis Trough (formerly referred to as the George V Basin). Sedimentary rocks occur as erratics in most of the piston cores from the continental shelf. These cores consist of glacial and glacial-marine diamictons. Specifically, several clasts of dark-brown indurated shale were recovered from core DF-79-37. Organic material is abundant within these shales and palynomorphs were concentrated. All of the identified spores are of Early Cretaceous age; therefore, glacial erosion has cut into Lower Cretaceous section somewhere in the vicinity of core DF-79-37. Further, more than one cycle of glacial erosion and deposition is indicated, because the shale clasts were covered with a well-indurated coating resembling till matrix in mineralogy and texture. The well-indurated nature of these shale clasts is in contrast to the almost unlithified character of the Lower Cretaceous siltstone recovered nearby.

E-35203

Kellogg, T.B., Kellogg, D.E., Hughes, T.J., **Amundsen Sea sediment coring,** *Antarctic journal of the United States,* 1985 20(5), p.79-81, 8 refs.

As part of a long-term effort to evaluate antarctic glacial history using marine sediments, sediment coring operations were conducted in the Amundsen Sea during January 1985. The objective was to obtain cores from which it could be determined if grounded ice formerly occupied the Amundsen Sea continental shelf and, if so, the chronology of ice-sheet advances and retreats. Because the cores were collected in plastic liners, sampling on shipboard was limited to core tops and bottoms. Preliminary impressions, gained from smear-slide analyses and visual inspection of the sediments suggest that: (1) sediments in the Amundsen Sea, especially in troughs such as the one fronting Pine Island Glacier, are much thicker than anticipated; (2) microfossil remains, especially diatoms, occur in very low abundance in Pine Island Bay cores, but abundances are higher elsewhere; (3) trough sediments are relatively fine-grained, soft, silty clays, but sediments from shallower locations are often compact, diatomaceous, glacial-marine deposits; and (4) no unequivocal basal tills were recovered.

E-35211

Moriwaki, K., **Report on the geological, geomorphological, and geodetic field party in the Sör Rondane Mountains, 1986 (JARE-27),** *Antarctic record,* Nov. 1986 30(3), p.246-281, 4 refs.

The 27th Japanese Antarctic Research Expeditions (JARE-27) carried out geological, geomorphological and geodetic field work in the central Sör Rondane Mountains from Jan. 5 to Feb. 6, 1986. Field work in the vast and heavily crevassed area was accomplished by two parties of four persons each, using ten oversnow vehicles. This report gives details of the operation including logistics, a summary of the field work, and information on the weather and the surface condition of snow and ice observed in this period. (Auth. mod.)

E-35212

Gribnitz, K.-H., Kent, L.E., Dixon, R.D., **Volcanic ash, ash soils and the inferred Quaternary climate of sub-antarctic Marion Island,** *South African journal of science,* Nov./Dec. 1986 82(11), p.629-635, 25 refs.

Field investigations and mineralogical and geochemical studies show that the soils developed in Holocene falls of volcanic ash and not by chemical weathering of the basaltic lavas as averred by previous investigators. Major-oxide analyses are given of Holocene ashes and scoria and of tuffs lying between Pleistocene lava flows. Fifteen trace elements were also determined. The analyses, the first of wind-borne pyroclastics from the island, are compared with those of the lavas. The Holocene ash consists of labradoritic feldspar, augite, pigeonite and glass. The glass shows signs of alteration, but clay minerals were not detected; the included ore minerals are altering to iron oxides/hydroxides. The red layer lying between Pleistocene lava flows at Macaroni Bay is a tuff and not a soil supposedly formed during a warm interglacial. The dating of Quaternary climatic changes based on an assumed uniform rate of accumulation of peaty deposits in a mire is questioned. An erosion cycle in rivers may reflect Holocene climatic changes. (Auth.)

E-35214

National Research Council. Polar Research Board, **Antarctic solid-earth sciences research: a guide for the next decade and beyond,** Washington, D.C., National Academy Press, 1986, 40p., 3 refs.

This report advocates a directed change in the U.S. approach to antarctic geoscience research. Research efforts should be multidisciplinary in nature, and highest priority should be assigned to investigations that have global, continental, or regional significance.

Aerogeophysics and marine geophysics studies hold the greatest potential for identifying the best areas to attack existing problems and for defining new problems. Specifically, the Unites States should focus its resources within two broad *transect zones,* identified as the Weddell Transect Zone and the Ross Transect Zone. Aerogeophysical, marine geophysical, and overland geophysical reconnaissance work, aimed at obtaining uniform geophysical coverage across and around both transect zones, should proceed as soon as possible. Required actions include: capability to apply the full range of modern remote sensing techniques; expanded capability for deep and shallow drilling and downhole observations; improved formal input to mission objectives of polar-orbiting satellites; name a standing Antarctic Geotraverse Advisory Committee; increase explicit scientific funding; develop means to continue to attract qualified U.S. scientists to antarctic research.

E-35231

Labracherie, M., **Sediment description and biostratigraphic data** [Descriptions sédimentologiques et données biostratigraphiques], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.191-324, In French., Refs. p.322-324.

Results of sedimentological and mineralogical analysis of 43 cores, obtained during the Apsara 2 and Antiprod 3 cruises, are summarized and tabulated. A classification of sediments is presented, and the core locations are mapped. Biostratigraphy shows formations from Lower and Middle Miocene, Lower Pliocene and Lower, Middle and Upper Quaternary.

E-35234

Laul, J.C., **Rare earth patterns in shergottite phosphates and residues,** *Journal of geophysical research,* Mar. 30, 1987 92(B4), Lunar and Planetary Science Conference, 17th, Part 2, p.E633-E640, 34 refs.

Leaching experiments with 1M HCl on ALHA 77005 powder show that rare earth elements (REE) are concentrated in accessory phosphate phases (whitlockite, apatite) that govern the REE patterns of bulk shergottites. The REE patterns of whitlockite are typically light REE depleted with a negative Eu anomaly and show a hump at the heavy REE side, while the REE pattern of apatite (in Shergotty) is light REE enriched. Parent magmas are calculated from the modal compositions of residues of ALHA 77005, Shergotty, and EETA 79001. The parent magmas lack a Eu anomaly, indicating that plagioclase was a late-stage crystallizing phase and it probably crystallized before the phosphates. The parent magmas of ALHA 77005 and Shergotty have similar REE patterns with a subchondritic Nd/Sm ratio. However, the Sm/Nd isotopics require a light REE depleted source for ALHA 77005 (if the crystallization age is <600 m.y.) and a light REE enriched source for Shergotty. Distinct Nd and Sr isotopic signatures may suggest different source regions for shergottites. (Auth.)

E-35235

Hasan, F.A., Haq, M., Sears, D.W.G., **Natural thermoluminescence of meteorites. I. Twenty-three antarctic meteorites of known Al-26 content,** *Journal of geophysical research,* Mar. 30, 1987 92(B4), Lunar and Planetary Science Conference, 17th, Part 2, p.E703-E709, 35 refs.

The level of thermoluminescence (TL) naturally present in 23 antarctic chondrites of known Al-26 content has been measured as a means of exploring their thermal and radiation history. Antarctic meteorites tend to have lower natural TL than non-antarctic meteorites, presumably because of their generally longer terrestrial ages. Details are given of relationships between natural thermoluminescence and Al-26 activity in terms of half life, recent severe shocks and recent reheating. (Auth. mod.)

E-35245

Bergh, H.W., **Underlying fracture zone nature of Astrid Ridge off Antarctica's Queen Maud Land,** *Journal of geophysical research,* Jan. 10, 1987 92(B1), p.475-484, 29 refs.

New geophysical data are used to refine the extent and setting of Astrid Ridge, a volcanic edifice lying off the Princess Astrid Coast section. New findings presented here include a well-defined fracture zone, occurring as a narrow basement ridge which extends northeast from Astrid Ridge, and an adjacent set of Mesozoic magnetic anomalies M0 to M9, which are offset by 120 km from an identical previously described set. A possible major swing in fracture zone trend prior to anomaly M9 is also suggested. (Auth. mod.)

E-35250

Gersonde, R., **Biogenic siliceous particle flux in antarctic waters and its palaeoecological significance,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.500-501, 4 refs.

Siliceous hardparts of planktonic microorganisms such as diatoms, silicoflagellates and radiolarians, which are preserved in the sediment record, can be used as "palaeoecological indicators" to reconstruct environmental conditions during the deposition of the sediments. Knowledge of alteration processes, transport mechanisms, and time-specific vertical transport is essential for the evaluation of the palaeoecological indicators found in the sediments. Since the austral summer of 1980-81, four moorings with sediment traps have been deployed at three sites in the western Atlantic sector of the Antarctic Ocean. Three moorings were installed in different water depths for time intervals ranging from 22 to 267 days. The data retrieved are being used for studies of alteration processes and transport mechanisms. The mooring at Bransfield Strait II was deployed for one year (Dec. 1983-Nov. 1984). The material collected is especially useful in the evaluation of time-specific vertical transport behavior of biogenous hardparts. About 60 to 80% of the sediment collected in the traps consists of biogenic opal. The rest is organic matter, lithogenic and biogenic calcareous particles. (Auth. mod.)

E-35253

Burckle, L.H., Abrams, N., **Diatom species diachrony in late Neogene sediments of the southern ocean,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.505-506, 14 refs.

A rigorously developed and applied biostratigraphy is a necessary prelude to any study of palaeoceanographic and palaeoclimatic changes in the southern ocean. Delineating the temporal and spatial distribution of such climate-dependent measures as ice-rafted detritus, hiatuses, and faunal and floral indices is strongly dependent upon establishing isochroneity either of first and last appearances of fossil species or of changes in abundance of selected species. Any use of the biostratigraphic method is greatly enhanced by its combined use with magnetostratigraphy and, for the latest Quaternary, with oxygen isotope stratigraphy. Here is examined the validity of some of the biostratigraphic schemes that have been used, their interpretation and their use in resolving specific palaeoceanographic problems. (Auth. mod.)

E-35255

Sugden, D.E., Clapperton, C.M., **Glacial history of the Antarctic Peninsula and South Georgia,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.509-513, 31 refs.

This paper summarizes geomorphological evidence in certain ice-free areas in West Antarctica and reconstructs glacial maximum con-

ditions and changes in glacier extent since the last glacial maximum. The geomorphological record of glacier history is short when compared to the marine record but it contributes a detailed and direct record of glacier fluctuations spanning both full glacial and interglacial conditions. It is reasonable to regard the detailed changes as an analogue for many of the glacial/interglacial fluctuations that have occurred in Antarctica, and thus the record, though short, may have a greater significance. Using data from George VI Sound, South Shetland Islands, and South Georgia, a climate transect is achieved covering Antarctic Continental, Antarctic Maritime, and Sub-Antarctic Maritime regimes. It provides a look at a wide range of glaciers relatively unaffected by climatic lags associated with the growth and decay of ice slabs. (Auth. mod.)

E-35257

Weed, R., Ackert, R.P., Jr., **Chemical weathering of Beacon Supergroup sandstones and implications for antarctic glacial chronology,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.513-516, 17 refs.

All rock surfaces in the Dry Valleys are subject to modern surficial processes, including wind, frost, salt, chemical and biological weathering. Two chemical weathering features—siliceous crusts and quartz rinds—may constrain palaeoclimate and chronology of host landforms. Evidence is presented that they form strictly subaerially, under arid conditions, and that they thicken with time. Thus they have implications for the climatic history of the Dry Valleys. Siliceous crusts and quartz rinds also characterize some sandstones in the Beardmore Glacier area and may occur in other parts of the Transantarctic Mountains. With calibration, the thicknesses of crusts and rinds may constrain exposure times of the sandstones on both erosional and depositional landforms. Therefore a method based on chemical weathering features complements other dating tools in ice-free Antarctica, which are based on soil development, radiometric ages and marine microfossil assemblages. Although the chemical weathering phenomena described here do indirectly constrain geomorphological history, weathering features are not direct indicators of landforms' origins. This is because weathering overprints are evident whether the host landforms are of subglacial or subaerial origin. (Auth.)

E-35258

Harwood, D.M., **Oldest record of Cainozoic glacial-marine sedimentation in Antarctica (31 Myr): results from MSSTS-1 drill-hole,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.516-519, 23 refs.

The MSSTS-1 (McMurdo Sound Sediment and Tectonic Studies) drill-hole was drilled in 1979 to obtain information about the Cainozoic history of the East Antarctic Ice Sheet and its relationship with the development of the Transantarctic Mountains. The site was drilled in western McMurdo Sound approximately 12 km north-west of Butter Point in a water depth of 195 m. A 229-m sequence of mudstone, sandstone and diamictite, all of glacial-marine origin, was drilled with 46% recovery (100,15 m). The present paper focuses on the lower 170 m of the MSSTS-1 drill-core, particularly the results stemming from diatom work. (Auth.)

E-35259

Pickard, J., **Early Pliocene marine sediments in the Vestfold Hills, East Antarctica: implications for coastline, ice sheet and climate,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.520-521, 13 refs.

The Vestfold Hills occupy an ice-free area of low elevation on the coast of East Antarctica. The low gneissic hills rise to an elevation of 160 m and are draped with a discontinuous cover of late Pleistocene and Holocene till. Holocene marine fossils are abundant in valleys with saline and hypersaline lakes. At Marine Plain in the south of the Hills, at least 8 m of diatomaceous sand are exposed in a natural scarp. The sediment contains diatoms, molluscs and foraminifera of early Pliocene age. This is the first record of late Tertiary marine fossils from Antarctica outside the Transantarctic Mountains and the Antarctic Peninsula. In this report a summary is given of the stratigraphy and fossils in the deposit, and its age, and implications for coastline, ice sheet volume and climate of Antarctica at the time of deposition are discussed. (Auth.)

E-35260

Pincheira, M., Pereira, M., Hoecker, G., Abad, E., **Geological antecedents and mineralization in the southern sector of Gerlache Strait, Antarctic Peninsula** [Antecedentes geológicos y ocurrencias de mineralización en el sector sur del estrecho de Gerlache, península Antártica], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.9-22, 13 refs., In Spanish with English summary.

In the southern area of Gerlache Strait, 3 stratified units are recognized: Bahia Charlotte Formation, composed by meta-sedimentary rocks, probably Upper Paleozoic-Triassic; Canal Lautaro Formation, formed by meta-volcanic rocks, mainly andesites and andesitic breccias, probably Jurassic in age; and Isla Wiencke Formation, composed by andesite and andesitic breccias assigned to the Upper Cretaceous. The intrusive rocks are grouped in two main units: Archipiélago Palmer Batholith, composed mainly by granodiorite, and Costa Danco Intrusives, formed by granite, granodiorite, diorite and gabbro. Two main mineral occurrences are recognized: copper and iron sulphides associated with acid to intermediate plutonic rocks of Costa Danco and Archipiélago Palmer Batholith; and magnetite and ilmenite associated to a belt of basic plutons and to their host rocks (andesites) at Canal Lautaro-Canal Errera. (Auth.)

E-35261

Troncoso A., A., **New organ species in the Tertiary tafoflora from Fildes Peninsula, King George Island, Antarctica** [Nuevas órgano-especies en la tafoflora terciaria de península Fildes, isla Rey Jorge, Antártica], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.23-46, Refs. p.44-46., In Spanish with English summary.

Twenty-one organ-species not recorded before in the fossil flora of Fildes Peninsula are reported; 19 of them consist of leaves or pinnae remains and two of fruit remains. One organ genus and one organ species are described as new entities for science *Sapindocarpon* and *S. covacevichii.* Based on this new information, the age of the fossiliferous beds is discussed, a (latter Palaeocene?) lower Eocene age is proposed for it. The characterization of the flora is also discussed; a "mixed paleoflora" type is inferred to confirm other authors' views. (Auth.)

E-35262

Hervé, F., Skewes, A., **Thermobarometry at the Scotia Metamorphic Complex, Cape Lookout, Elephant Island** [Termobarometría en el complejo metamórfico de Scotia, cabo Lookout, isla Elefante], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.47-54, 13 refs., In Spanish with English summary.

The biotite-garnet geothermometer indicates equilibrium temperatures of about 460 C in schists near Cape Lookout, Elephant Island. This was probably the temperature during the waning stages of the metamorphic episode in which the predominant S2 foliation was gene-

rated. Secondary fluid inclusions in quartz veins along S2 indicate pressures of ca. 2 Kb for similar temperatures. The indicated P and T values are probably minimum values for the amphibolite to albite-epidote amphibolite metamorphism facies of the rocks. (Auth.)

E-35263

Hervé, F., Kawashita, K., **Cretaceous K-Ar ages of the Scotia Metamorphic Complex in Cape Lookout, Elephant Island** [Edades K-Ar cretácicas del Complejo Metamórfico de Scotia en cabo Lookout, isla Elefante], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.55-56, 5 refs., In Spanish.

Radiometric age determinations of the Scotia Metamorphic Complex, carried out on Cape Lookout rocks by the K-Ar method, are discussed. Tabulated results, showing the age in 3 samples to be 108, 110 and 105 m.y., respectively, indicate that metamorphism occurred toward the end of Lower Cretaceous. It is pointed out that this seems to be a period of intense orogenic activity in the Scotia Arc.

E-35288

Adams, C.J., **Geochronological studies of the Swanson Formation of Marie Byrd Land, West Antarctica, and correlation with northern Victoria Land, East Antarctica, and South Island, New Zealand,** *New Zealand journal of geology and geophysics,* 1986 29(3), p.345-358, 25 refs.

Potassium-argon (K-Ar) total-rock and rubidium-strontium (Rb-Sr) whole-rock isochron age determinations of slates in the Swanson Formation of Marie Byrd Land, are reported. The K-Ar ages form two groups, 350-380 Ma and 410-450 Ma. The younger group reflects a pervasive thermal effect associated with intrusion of Late Devonian granites in the area, and the maximum age of the older group (about 450 Ma) dates an early phase of deformation, cleavage formation, and low-grade regional metamorphism during the Late Ordovician. Rb-Sr whole-rock isochron ages of these slates also yield Late Ordovician ages (c. 444 Ma) which determine the time of metamorphism of the Swanson Formation. A model Rb-Sr age of the least metamorphosed pelite indicates that Swanson Formation is not older than Precambrian. Re-examination of published Rb-Sr whole-rock data of the Fosdick metamorphic rocks suggests they are migmatised Swanson Formation with Cretaceous granite as the injection phase. Good correlations can be made with similar quartzose turbidite sequences elsewhere, in eastern Marie Byrd Land, on Campbell Island, and the West Coast of the South Island of New Zealand. (Auth. mod.)

E-35299

Howard-Williams, C., Vincent, W.F., Wratt, G.S., **Alph River ecosystem: a major freshwater environment in southern Victorialand,** *New Zealand antarctic record,* 1986 7(2), p.21-33, 11 refs.

The glacier fed streams of southern Victoria Land are characterized by their emphemeral nature and extreme variability in flows even on an hour to hour basis. Most are small, with discharges less than 0.1 cu m/s and a number of them are biologically rich with dense growths of algae which proliferate during the summer melt period. This report documents the ecological characteristics of what is possibly the world's most southerly known river system which was first discovered in 1911 by the western sledging party on Scott's last expedition. Apart from a mention in the geological survey of the area in 1960 this extensive flowing water system has not been referred to since. (Auth.)

E-35314

Ineson, J.R., **Trace fossils from a submarine fan-slope apron complex in the Cretaceous of James Ross Island, Antarctica,** *British Antarctic Survey. Bulletin,* Feb. 1987 No.74, p.1-16, 26 refs.

The Kotick Point and Whisky Bay Formations (Aptian-Coniacian) of NW James Ross Island represent slope apron and proximal submarine fan deposits of a marine back-arc basin. Although classical deep-water trace fossils are represented, the ichnofauna includes several forms typically assigned to shallow-water environments and trace fossil assemblages are closely tied to sedimentary facies. Mudrich, slope apron deposits are characterized by the assemblage *Chondrites-Zoophycos-Planolites-Teichichnus* whereas coarse, sandy fan sequences typically contain the assemblage *Thalassinoides-Ophiomorpha-Palaeophycus.* Clearly, in such a proximal marine setting, substrate and local energy levels are more influential than absolute bathymetry. (Auth.)

E-35335

Anderson, J.B., **Preliminary results from the *USCGC Glacier* 1985 cruise,** *Antarctic journal of the United States,* 1985 20(5), p.81-85, 4 refs.

Four areas were surveyed as part of a cruise along the antarctic continental margin. These include the western margin of the South Orkney Plateau, portions of the Bransfield Strait and the adjacent continental shelf of the South Shetland Islands, Marguerite Bay, and Pine Island Bay. In all, some 761 km of seismic data and approximately 5,000 km of bottom profiler data were obtained. In addition, 115 piston coring stations and 15 grab sample stations were occupied. The scientific party consisted of geologists from Rice University and the University of Maine at Orono. This report provides an account of samples and data obtained and a summary of preliminary findings.

E-35336

Smith, M.J., **Marine geology of the northwestern Weddell Sea and adjacent coastal fjords and bays: implications for glacial history,** *Antarctic journal of the United States,* 1985 20(5), p.85-86, 1 ref.

During austral summer 1981-1982, scientists on board the U.S. Coast Guard icebreaker *Glacier* collected 53 piston cores and grab samples from the northwest Weddell Sea continental shelf and from fjords and bays of the James Ross Island area. The purpose of this study was to examine these cores in light of the postulated expansion of the late Pleistocene Antarctic Peninsula ice sheet into this region. Results of detailed sedimentologic, compositional, and clast-shape analyses are reported.

E-35339

Healy-Williams, N., Ehrlich, R., Williams, D.F., **Morphometric and stable isotopic evidence for subpopulations in high latitude *Globorotalia truncatulinoides*,** *Antarctic journal of the United States,* 1985 20(5), p.90-92, 9 refs.

A detailed morphometric and isotopic study was conducted on populations of *Globorotalia truncatulinoides* from core-top samples from the southern Indian Ocean. Recently new techniques have been developed for describing precisely the shape outline of microfossils. Use of these quantitative methods and automated digitizing instruments makes it possible to produce rapidly the data necessary to test hypotheses concerning the paleobiology and paleoecology of microfossils. The results of this study demonstrate for the first time that the assumption of unimodality in population structure may lead to an oversimplified understanding of the changes in foraminiferal populations through time and space, i.e., latitudinal changes in distributions and vertical changes in the water column. For example, the population structure of *G. truncatulinoides* in the southern Indian Ocean is biomodal to polymodal, reflecting the existence of three subpopulations. Each subpopulation has a particular shape and isotopic character.

E-35340
Burak, R.W., Burckle, L.H., **Late Quaternary diatom stratigraphy in the Indian sector of the southern oceans,** *Antarctic journal of the United States,* 1985 20(5), 93p., 6 refs.

Late Quaternary stratigraphies are set up for two diatom species *(Hemidiscus karstenii* and *Eucampia antarctica)* in selected cores from the Indian sector of the southern oceans. The first abundant appearance datum (FAAD) of *H. karstenii* occurs near the oxygen isotope stages 11/12 boundary at about 430,000 years ago. The last abundant appearance datum (LAAD) occurs near the top of oxygen isotope stage 7 at about 195,000 years ago. Through this interval, abundance values for *H. karstenii* range from 0 to as high as 70 percent. Maximum abundance of *E. antarctica* in the Indian sector commonly occurs at a glacial/interglacial transition, the single exception being the oxygen isotope stage 6/7 boundary. In the present day southern oceans, *E. antarctica* is found in highest abundance close to the continent, adjacent to icebergs, and associated with sea ice.

E-35341
Fisher, R.L., Natland, J.H., Dick, H.J.B., **Mafic and ultramafic rock assemblages from the Antarctic Plate boundary, southwest Indian Ocean,** *Antarctic journal of the United States,* 1985 20(5), p.94-96, 2 refs.

In January and February 1984, as one phase of the 8-month PROTEA Expedition, *R/V Melville* carried out a 31-day bathymetric magnetic and igneous rock sampling exploration of the Antarctic/Africa plate boundary. The plate edge was examined from longitudes 23 deg to 48 deg E; this program, completing a rock-sampling reconnaissance of the African plate boundary along 11,000 km of its length, builds upon and here extends coverage obtained to the west and to the northeast in earlier studies. Out of *Melville's* track of 9,750 km, underway watch-standing produced 9,315 km of precision depth recording, 7,925 km of total-field magnetics, and 5,290 km of single-channel digital seismic reflection profiling. These bathymetric data have been used to update recent interpretations of tectonic trends. The principal determinant on this leg of the PROTEA Expedition—and the primary on-station activity—was the recovery by dredge of mafic extrusive and plutonic crustal rocks. Of 36 attempts, 33 hauls recovered igneous rocks with a total weight of 7,146 kg. Well over 3,000 specimens were sawed, examined, and described in hand-specimen during the 31-day operation.

E-35342
Hambos, S., Burckle, L.H., **Evidence for early Late Miocene climate change,** *Antarctic journal of the United States,* 1985 20(5), p.96-97, 3 refs.

Diatoms were studied in sediments from five late middle to early Late Miocene sites from the southern oceans. Magnetostratigraphic control in one piston core (IO1277-25) combined with the application of foraminiferal datum levels in DSDP sites 278 and 512 indicate that the majority of sites cover the interval approximately 8.5 to 10.4 million years ago. The data show considerable fluctuation in abundance of individual diatoms through this time interval. In DSDP site 278 these abundance changes coincide with changes in the oxygen isotope ratio and are likely tied to water mass shifts. However, it is difficult to relate these fluctuations to north-south movements of the Polar Front since, in the present-day southern ocean and in surface sediments, diatoms also show striking changes across the subantarctic front. In any event, during the interval of time studied, we see one northward expansion and one southward contraction of polar waters. This expansion is seen as a marked increase in abundance of *Denticulopsis dimorpha* accompanied by a decrease in abundance of *D. praedimorpha.*

E-35355
Kaharoeddin, F.A., Cassidy, D.S., **Basal sediment ages of 1983 piston cores,** *Antarctic journal of the United States,* 1985 20(5), p.121-122, 4 refs.

Presented here are the preliminary basal sediment ages of piston cores and bagged piston-core sediments recovered during austral summer 1982-1983 in the Ross Sea/Sulzberger Bay area. Most sediments recovered on this cruise are clastic glaciomarine sediments which are either barren or contain very few microfossils. The only significant presence of a biogenic component in any of these cores is found in core 17. That component consists of diatomaceous ooze and muddy diatomaceous ooze with diatoms that are moderately to poorly preserved. The age of this core is Late Miocene/Early Pliocene. The only common microfossils present in the glaciomarine sediments are diatoms; thus, the age-diagnostic diatoms were used in determining the basal sediment ages. The presence of reworked microfossils, commonly encountered in these sediments, made age determinations difficult.

E-35390
Lal, M., **Preliminary report of the Third Indian Antarctic Expedition,** *Indian Geologists' Association. Bulletin,* June 1985 18(1), p.43-48, 8 refs.

Preliminary field observations about the Schirmacher Ponds are reported. A geological map depicts five litho-units; hornblende-biotite gneiss, augen gneiss, rusty-banded gneiss, garnet-biotite gneiss and banded gneiss. Intrusions of pegmatite, amphibolite, dolerite and aplite are seen. Wohlthat Mountain has anorthosite rocks. Structurally the area is complex. Dips are between 20-70 deg and rarely vertical, folding variously from open to recumbent. Small shear zones are noted with mylonite association. (Auth.)

E-35391
Semenov, V.S., **Conditions of formation of kyanite- and orthoclase-bearing parageneses in the Mount Provender-Pratt Peak area, Shackleton Range, Antarctica,** *Akademiia nauk SSSR. Doklady. Earth science sections,* Mar.-Apr. 1985 281(2), p.130-132, 3 refs. For Russian original see 15E-31827.

Rocks metamorphosed under conditions of the kyanite-garnet-biotite-orthoclase subfacies of the high-pressure almandine-amphibolite facies are rare. In Antarctica, in particular, such rocks have never before been described. Kyanite- and orthoclase-bearing gneisses and crystalline schists exposed here in the Shackleton Range are interesting, because they were formed at extreme pressure and temperatures in the presence of fluid solutions with a somewhat unusual, hydrocarbon-rich composition. To determine the conditions under which kyanite- and orthoclase-bearing parageneses were formed, three independent methods were used: 1) the petrogenetic grid, 2) mineral thermobarometry (garnet-biotite and staurolite-garnet geothermobarometers), and 3) thermobarogeochemistry (homogenization of gas-liquid and melt inclusions in garnet crystals and quartz grains). (Auth.)

E-35418
Kwok, J.E.D., **Trace element analysis of antarctic H chondrites: chemical weathering and comparisons with their non-antarctic counterparts,** Lafayette, Purdue University, 1986, 132p., University Microfilms order No.86-22176, Ph.D. thesis. Refs. p.122-129.

Reported are compositional data for mobile/volatile trace elements Ag, Au, Bi, Cd, Co, Cs, In, Rb, Sb, Se, Te, Tl, U, and Zn in a suite of antarctic H chondrites. The data show that heavily oxidized H chondrites are leached of a portion of their trace elements and, therefore, have been chemically compromised by their stay in Antarctica. The less oxidized specimens seem to have retained their chemi-

cal integrity. The use of chemical data to measure the degree of a chondrite's chemical weathering is suggested. The data is compared to that obtained previously for non-antarctic H chondrites. Many statistically significant differences are found between non-antarctic and Victoria Land H chondrites of each petrologic type and of shock facies d-f. Leaching of the Victoria Land chondrites is not a viable explanation for these differences because many mean elemental concentrations are higher in the Victoria Land population. Two-element scatter plots of Bi, In, and Tl also reveal remarkable differences which cannot be due to shock-heating or leaching of Victoria Land chondrites, even though this population has a higher percentage of heavily shocked chondrites than the non-Antarctic population. After ruling out alternate explanations, these differences are believed to be preterrestrial and are attributed to a changing meteoroid flux to Earth with time. (Auth. mod.)

E-35421

Macellari, C.E., **Late Cretaceous stratigraphy, sedimentology, and macropaleontology of Seymour Island, Antarctic Peninsula, Vol.1,** Columbus, Ohio State University, 1984, 599p., University Microfilms order No.85-04048, Ph.D. thesis. Refs. p.458-489.

A monotonous, 1400m thick, continuous sequence of friable siltstones and occasional indurated sandstones is exposed in the southern portion of Seymour I. This sequence, composed of the Lopez de Bertodano, Sobral, and Cross Valley formations (all belonging to the Marambio Group), is the sedimentary record of a marine depositional cycle that started during the late Campanian and ended in the Paleocene. These sediments were sampled in detail during two field seasons. Extensive collections made during field work provide data on the stratigraphic distribution of an abundant and well preserved macrofauna. Annelids, bivalves, ammonites and gastropods have been studied in this work. Sixty three taxa are described in detail, including 11 new species and 12 new occurrences for the area. From a paleobiogeographic perspective, the fauna is strongly endemic. It does have close affinities, however, with other late Cretaceous faunas of the Weddellian Province, which developed along a rectilinear coast extending from Australia to southern South America. (Auth. mod.)

E-35422

Borg, S.G., **Granitoids of northern Victoria Land, Antarctica,** Tempe, Arizona State University, 1984, 355p., University Microfilms order No.85-04256, Ph.D. thesis. Refs. p.230-241.

The pre-Permian metamorphic basement rocks of northern Victoria Land may be divided into three terranes which are separated by NNW-trending, high-angle faults: the Wilson Terrane (WT), the Bowers Terrane (BT), and the Robertson Bay Terrane (RBT). Granitic rocks occur throughout the region and most may be grouped as either lower Paleozoic Granite Harbour Intrusives (GHI) or middle Paleozoic Admiralty Intrusives (AI). These two groups are spatially and temporally distinct and each group exhibits a well-defined but differently-directed compositional polarity. The Cambro-Ordovician GHI are confined to the WT and comprise a variety of lithologies of both I- and S-type. The Devonian AI occur only within the BT and RBT and consist of rather homogeneous plutons of I-type tonalite, granodiorite and monzogranite. Thus, an allochthonous origin for the BT and RBT is indicated. The chemical and isotopic character of the AI and GHI indicates that a major discontinuity in the lower crust coincides with the geologic boundary between the WT and the BT plus RBT. In addition to these two major groups of granitoids, two unique occurrences of other granitic rocks exist. This is the first evidence of such extreme fractionation in this volcanic province. (Auth. mod.)

E-35426

Leclaire, L., **Nature and age of the Kerguelen-Heard Plateau, south sector. Preliminary results of the *N.A.S.K.A.-MD 48* cruise** [Nature et age du plateau de Kerguelen-Heard, secteur sud. Résultats préliminaires de la campagne *N.A.S.K.A.-MD 48*], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série II,* Jan. 1987 304(1), p.23-28, In French with English summary. 17 refs.

From bathymetric, magnetic and single channel seismic reflection data, sediment cores and dredged rocks, an outline of the stratigraphy and structural evolution of the Kerguelen Plateau was developed. Basement is basaltic submarine lava which was extruded and partly eroded, probably before the late Cretaceous. A northwest-trending sedimentary basin with 3-4 km of Cretaceous to Quaternary sediment overlies basement. The lowermost exposed sediments are Upper Cretaceous to Paleogene pelagic calcareous nanno-ooze and chalks, which may merge laterally with neritic sediments (undated) deposited on shoals in the vicinity of the 77 East Graben. An upper sedimentary sequence, separated from the lower by an horizon of interbedded cherts, consist of Upper Eocene to Oligocene calcareous nanno-ooze, and Neogene to Quaternary calcareous and siliceous oozes. The 77 East Graben has the appearance of a failed rift, and may have developed during extensional tectonism in the Eocene, a time of re-organization of plate motion in the Indian Ocean. (Auth. mod.)

E-35437

Tessensohn, F., **Antarctica remains the last area in its natural state: the race for natural resources is not taking place** [Antarktis bleibt das letzte Stück Natur: der Wettlauf um die Bodenschätze findet nicht statt], *Bild der Wissenschaft,* Sep. 1985 No.9, p.44-56, In German. 3 refs.

The statement of the title is rephrased as the question: "Has the race for antarctic minerals really started?" and a case is made for the answer that the race is not taking place. A review is given of antarctic geology and the processes involved in establishing mineral deposits, going back to the Gondwana concept. Antarctic geology is compared to that of other regions where mineral deposits have been discovered and exploited. Deposits, or lack thereof, of copper, zinc, uranium, oil, and gas among others, are considered.

E-35440

Englert, P., **Meteorites from Antarctica** [Meteorite aus der Antarktis], *Sterne und Weltraum,* Jan. 1987 26(1), p.18-23, In German. 4 refs.

Over the course of thousands of years meteorites have sunk into the ice sheet of Antarctica. In this report the author, who took part in an antarctic expedition, explains why this is so, how the meteorites are collected, and what scientific significance these exceptional finds have.

E-35448

Friedmann, E.I., Weed, R., **Microbial trace-fossil formation, biogenous, and abiotic weathering in the antarctic cold desert,** *Science,* May 8, 1987 236(4802), p.703-705, 12 refs.

In the antarctic cold desert the survival of the cryptoendolithic microorganisms that colonize the near-surface layer of porous sandstone rocks depends on a precarious equilibrium of biological and geological factors. An unfavorable shift of this equilibrium results in death, and this may be followed by formation of trace fossils that preserve the characteristic iron-leaching pattern caused by microbial activity. Similar microbial trace fossils may exist in the geological record. If life ever arose on early Mars, similar processes may have occurred there and left recognizable traces. (Auth.)

E-35449
Le Roex, A.P., **Local and regional homogeneity in MORB from the Mid-Atlantic Ridge between 54.5S and 51S: evidence for geochemical enrichment,** *Geochimica et cosmochimica acta,* Mar. 1987 51(3), p.541-555, 78 refs.

Basaltic lavas from the southern Mid-Atlantic Ridge between the Bouvet triple junction at 54.5S 1W and 51S, show a range in texture from aphyric to highly olivine or plagioclase porphyritic. Olivine with or without Cr-spinel and/or plagioclase are the dominant phenocryst phases, and clinopyroxene occurs as a phenocryst or microphenocryst phase in many lavas. The range in differentiation can be attributed to crystal fractionation/accumulation; basalts from fracture zones show a greater range than basalts from ridge segments. The fracture zone basalts also show a minor transform fault effect in that their compositions are consistent with lower degrees of partial melting than the ridge axis basalts. This difference is, however, not manifested in incompatible trace element ratios. The geochemical signature of enriched MORB from this region is distinct from that associated with the Bouvet mantle plume and enriched MORB from the Southwest Indian and the American-Antarctic Ridges. The enriched signature results from source region mixing achieved by veining of normal depleted mantle by low volume partial melts associated with the rising Shona plume. Subsequent partial melting, during upwelling below the ridge axis, has led to the geochemical enrichment observed in MORB from this region. (Auth. mod.)

E-35450
Dennison, J.E., Lipschutz, M.E., **Chemical studies of H chondrites. II: Weathering effects of Victoria Land, Antarctic population and comparison of two antarctic populations with non-antarctic falls,** *Geochimica et cosmochimica acta,* Mar. 1987 51(3), p.741-754, 38 refs.

Reported here are RNAA data for 14 siderophile, lithophile and chalcophile volatile/mobile trace elements (Ag, Au, Bi, Cd, Co, Cs, Ga, In, Sb, Se, Te, Tl, U, Zn) in interior portions of 45 different H4-6 chondrites (49 samples) from Victoria Land and 5 H5 chondrites from the Yamato Mts. Relative to H5 chondrites of weathering types A and B, all elements are depleted (10 at statistically significant levels) in extensively weathered (types B/C and C) samples, probably by leaching on the ice sheet surface. Contents of 8 elements in extensively weathered samples may provide a qualitative ranking for terrestrial surface residence. Chondrites of weathering types A and B seem compositionally uncompromised and as useful as contemporary falls for trace-element studies. When data distributions for these 14 trace elements in non-antarctic H chondrite falls and unpaired samples from Victoria Land and from the Yamato Mts. are compared statistically, numerous significant differences are apparent. These and other differences give ample cause to doubt that the various sample populations derive from the same parent population. The observed differences do not reflect weathering, chance or other trivial causes: a preterrestrial source must be responsible. The least unlikely of these involves a temporal variation in the source regions from which meteoroids derive. (Auth.)

E-35457
Matsubara, S., Motoyoshi, Y., **Potassium pargasite from Einstödingen, Lützow-Holm Bay, East Antarctica,** *Mineralogical magazine,* Dec. 1985 49(1), p.703-707, 9 refs.

Potassium pargasite containing 3.19 wt.% K2O was found in a skarn from the islet of Einstödingen, Lützow-Holm Bay, together with some high potassium pargasitic amphiboles. A positive correlation is shown between Fe(2+)/Mg+Fe(2+) and K/(K+Na(A)) ratios in pargasitic amphiboles suggesting that the increase of Fe(2+) serve to stabilize high-K pargasites under the metamorphic conditions of the granulite facies. (Auth.)

E-35459
Shemenda, A.I., **Mechanism of spreading in marginal seas,** *Oceanology,* Aug. 1986 26(1), p.80-85, Translated from Okeanologiia. 26 refs.

Back-arc expansion and spreading are associated primarily with the drawing of an underthrust oceanic plate into a subduction zone by its own excess weight and with the relative movement of the Benioff zone and surrounding mantle, particularly with asthenospheric currents. The development of the South Sandwich subduction zone with an active back-arc basin is shown to be governed primarily by eastward asthenospheric flow under the Scotia Sea. Three possible cases giving rise to back-arc spreading are considered: breakage of the overriding plate immediately above a volcanic arc (Marianas and Tonga-Kermadec subduction zones); complete separation of the overriding lithosphere from the subducting plate (South Sandwich zone); and destruction of lithosphere in the back-arc zone itself (Ryukyu, Japan and Kuril arcs). (Auth.)

E-35465
Lemoigne, Y., **Confirmation of the existence of a triassic flora on Livingston Island, South Shetland Islands** [Confirmation de l'existence d'une flore triasique dans l'île Livingston des Shetland du sud (Ouest Antarctique)], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série II,* Mar. 14, 1987 304(10), p.543-546, In French with English summary. 2 refs.

Among new plant samples collected in Jan. 1986 at Williams Point, Livingston I., the following are identified: *Neocalamites, Cladophebis, Dictyophyllum, Marattiopsis, Dicröidium, Taeniopteris, Sphenobaiera, Caytonia, Pagiophyllum* and *Scoresbya.* The findings confirm the existence of an Upper Triassic flora in that region. (Auth. mod.)

E-35468
Silva Martins, L.R., Rosa Martins, I. da, Toldo, E.E., Jr., Gruber, N.L., **Contribution to the study of sediments in the Bransfield Strait region** [Contribuicão ao estudo dos sedimentos da região estreito de Bransfield (Antártica)], *Pesquisas,* 1987 No.19, p.127-146, In Portuguese with English summary. 19 refs.

Intending to contribute to a better understanding of the glacial and glacio-marine sedimentation near the Brazilian Ferraz Station, surface and core samples from Deep Freeze 82 (USA) and Antarctica IV (Brazil) missions were analyzed. Unsorted deposits produced by the direct action of grounded ice sheet (ortotill) from floating ice and marine currents (paratill), gravity flows (mass flow, debris flow and turbidity currents) are the main deposits occurring along the continental shelf, slope and rise. Biogenic siliceous mud and ooze, laminated terrigenous muds and vulcaniclastic sediments are also important components. (Auth.)

E-35470
Prasolov, E.M., Semenov, V.S., Travnikova, L.G., **Gaseous hydrocarbons in metamorphic pararocks of Antarctica,** *Akademiia nauk SSSR. Doklady. Earth science sections,* July-Aug. 1985 (Pub. Mar. 87) 283(4), p.65-68, For Russian original see 15E-32604. 8 refs.

Petrographic studies carried out in the northern portion of Shackleton Range are reported. Samples studied represent two zones differentiated by: stage of metamorphization, zone A, and rock composition, zone B. Tabulated data of gas composition from microscopic inclusions in garnets are presented. A much higher content of hydrocarbon gases is found in zone A than in zone B.

E-35479
Vtiurin, B.I., **Geocryological account of the Schirmacher Oasis,** *Polar geography and geology,* Jul.-Sep. 1986 10(3), p.200-212, For Russian original see 40-3645 or E-33892. 16 refs.

The active layer in the Schirmacher Hills region was studied in detail from Nov. 1981 to March 1982. In unconsolidated materials the commonest variant of cryogenic structure is a massive subtype with no lenses or layers of ice; a streaky subtype occurs in some fine-grained sediments. Segregation ice is relatively rare and no wedge ice was reported. The only massive ground ice is buried glacier ice near the ice cap margin. Frost shattering is the most widespread and most effective weathering mechanism. Sorted circles, nets and polygons are widespread in the unconsolidated materials and were studied in detail by the author. Sorted stripes occur only rarely. Thermokarst is very poorly developed even where blocks of buried ice were exposed. (Auth.)

E-35483
Schultz, L., **Witnesses from the beginning of our solar system** [Zeugen vom Anfang unseres Sonnensystems], *MPG-Spiegel,* Dec. 1986 No.6, p.6-9, In German.

The recent upsurge of meteorite finds in Antarctica is briefly reviewed, but more questions are raised than answers given. Why, for example, did so many reach Antarctica rather than other places on earth; and did any of them originate on Mars or the Moon? Some of the evidence seems to indicate that SNC meteorites may have come from Mars.

E-35489
Ellis, D.J., **Origin and evolution of granulites in normal and thickened crusts,** *Geology,* Feb. 1987 15(2), p.167-170, 40 refs.

Rocks buried in the upper part of a doubly thickened crust during orogeny can show prograde reactions with transitional features from lower grade rocks up to granulite facies. They can be exposed at the earth's surface within this one orogenic cycle. In contrast, rocks buried in the lower part of a thickened crust will crystallize granulites that typically show only retrograde relations with younger, lower grade rocks. At the cessation of orogeny, such rocks will undergo near-isobaric cooling from the peak metamorphism and can have very long residence times at the base of a crust of normal thickness. These granulites require a second orogeny to uplift and expose them at the surface. As an example, the Archean granulites of Enderby Land were metamorphosed at 3070 Ma at 1000 C at 8-10-kbar pressure. They then followed at least a 400 C isobaric cooling path. They also had a prolonged residence time of 2000 m.y. near the base of the crust before uplift. No doubt a continuum exists between these extremes, but it is proposed that many intermediate- and high-pressure granulites form in the lower parts of thickened crust and therefore require a two-stage cycle of tectonism to be uplifted and exposed at the earth's surface. (Auth. mod.)

E-35495
Miotke, F.-D., **Dunes in Victoria Valley, Victoria Land: a report on eolian formation in extremely cold climates** [Dünen im Victoria Valley, Victoria-Land, Antarktis: ein Beitrag zur äolischen Formung im extrem kalten Klima], *Polarforschung,* 1985 55(2), p.79-125, In German with English summary and figure captions. 54 refs.

The special conditions for eolian processes forming dunes in extreme polar regions are discussed in comparison to other climatic zones. Sand movements directly on the surface of the dune relief and sand drift within the air above ground are determined at different wind velocities. Additionally, migration of dune ridges in relation to wind velocities was measured during the summer. The results of these studies show that by far, most sand is transported within the dunes. Locally, snow included within sand strata moistens the sand when thawed and cements it when refrozen. The large amounts of heat energy required for melting and evaporation restrict the release of sand grains so that despite high wind velocities sand migration is often minimal. Therefore, the heat balance within the upper decimeter of dune sands determines the eolic erosion rates. During the antarctic winter sand can only be blown away where it is already dry and therefore movable. Consequently, the strong winterly west winds can only moderately modify the dune relief which was formed by prevailing east winds during the summer. (Auth. mod.)

E-35516
Udintsev, G.B., **Topography and structure of the ocean bottom** [Rel'ef i stroenie dna okeanov], Moscow, Nedra, 1987, 239p., In Russian. 50 refs.

Current information on the topography and crustal composition of the bottom of the world ocean is presented. Particular attention is paid to the structural morphology in relation to the topography; the exogenous processes are investigated. Tectonic irregularities of the bottom, various processes and the formation of the structural topography are discussed. The application of different tectonic concepts to contemporary data on the oceans' bottom topography is assessed. Detailed information of the geotectonics of the antarctic sector of the Pacific, Indian and Atlantic oceans on p.52-60, 137-142 and 143-150, respectively.

E-35590
Black, L.P., Williams, I.S., Compston, W., **Four zircon ages from one rock: the history of a 3930 Ma-old granulite from Mount Sones, Enderby Land, Antarctica,** *Contributions to mineralogy and petrology,* 1986 94(4), p.427-437, 21 refs.

Ion microprobe U-Th-Pb analyses of zircons from a granulite-grade orthogneiss from Mount Sones, Enderby Land, record the ages of four principal events in the history of the gneiss, three of which already have been recognized through previous isotopic dating of other samples. The structure of the zircons indicates at least four different stages of growth. The stratigraphically oldest zircon (rare discrete cores) is indistinguishable in age from the most common, euhedrally zoned zircon. Both crystallized when the tonalitic precursor of the orthogneiss was emplaced into the crust 3927 Ma ago, making the orthogneiss currently the oldest known terrestrial rock. Deformation, and possibly a minor rise in temperature, produced widespread perturbations of other isotopic systems throughout the Napier Complex. (Auth. mod.)

E-35591
Harley, S.L., **Sapphirine-cordierite-garnet-sillimanite granulite from Enderby Land, Antarctica: implications for FMAS petrogenetic grids in the granulite facies,** *Contributions to mineralogy and petrology,* 1986 94(4), p.452-460, 20 refs.

A quartz-absent magnesian paragneiss layer from Mount Sones, in the Archaean Napier complex of Enderby Land contains the stable divariant FMAS assemblage sapphirine-cordierite-garnet-sillimanite. Rare green spinel occurs as inclusions mainly within sapphirine, but also within sillimanite and garnet. Late thin coronas of cordierite mantle sapphirine in contact with extensively exsolved anorthoclase. The mineral textures are interpreted to indicate the former stability of a hypersthene-quartz absent assemblage followed by the development of the FMAS equilibrium assemblage sapphirine-cordierite-garnet-sillimanite (sp, hy, qz) and further divariant reaction involving the consumption of sapphirine. The (sp, hy, qz) assemblage uniquely defines the stable P-T reaction topology appropriate to granulites from the Napier Complex, but is not possible in other grids which assume the stability of a sapphirine-absent FMAS invariant point involving

the phases spinel, garnet, hypersthene, cordierite, sillimanite and quartz. (Auth. mod.)

E-35620

Weber, W., **Solid mineral raw materials, coal and petroleum/natural gas in the Antarctic** [Feste mineralische Rohstoffe, Kohle und Erdöl/Erdgas in der Antarktis], *Zeitschrift für geologische Wissenschaften,* 1987 15(1), p.49-58, In German with English and Russian summaries. 25 refs.

In the course of geological mapping about 100 occurrences of metallic, and about 40 occurrencss of non-metallic solid mineral raw materials and about 25 occurrences of coal have been discovered in Antarctica. Moreover, there are speculations on geothermal energy and hydrocarbons. Relatively well known are fresh water resources in the form of ice. The banded iron formation in the Prince Charles Mountains, the occurrences of graphite, beryllium and mica in Dronning Maud Land and the coal beds of Victoria Land could be characterized as deposits in a geological sense. Recently some geological investigations in Antarctica have been entering the stage of prospecting for mineral and fossil raw materials. But it is impossible to make statements about the date and extent of the exploitation of the antarctic geological resources. This depends on geological, technological, economical as well as political and strategic factors. (Auth.)

E-35624

Crame, J.A., **Late Mesozoic bipolar bivalve faunas,** *Geological magazine,* Nov. 1986 123(6), p.611-618, Refs. p.616-618.

Bipolar bivalve genera probably existed through the greater part of Late Mesozoic (i.e. late Jurassic-late Cretaceous) time. Of the various theories put forward to account for their presence, those based on some form of global climatic zonation seem most appropriate. Although equatorial-polar temperature gradients were substantially less in Late Mesozoic time than at present, high latitude regions were subjected to temperate (or even cool-temperate) climatic regimes. Macrobenthonic marine faunas may have been more susceptible to differentiation in response to these climatic patterns than nektonic ones. This is particularly so in the Late Mesozoic strata of the Southern Hemisphere. (Auth.)

E-35644

Takeda, H., Huston, T.J., Lipschutz, M.E., **On the chondrite-achondrite transition: mineralogy and chemistry of Yamato 74160 (LL7),** *Earth and planetary science letters,* 1984 Vol.71, p.329-339, 35 refs.

A study is reported on the petrology, mineralogic properties and contents of major elements and trace elements Ag, Au, Bi, Cd, Co, Cs, Ga, In, Rb, Se, Te, Ti, U and Zn (determined by radiochemical neutron activation analysis) in Yamato 74160, interpreted as an LL7 chondrite. All properties are consistent with this meteorite having been recrystallized and partially melted locally once at temperatures well above 1090 C under conditions such that some minerals (e.g. plagioclase, euhedral pyroxene, tetrataenite) grew from melt pockets and siderophilic and chalcophilic elements were lost by extraction into eutectic melt that drained away. Inhomogeneous plagioclase compositions and mobile element loss suggest shock as the most likely heat source. Yamato 74160, while inferentially chondritic, is a larval achondrite: even higher temperatures and longer times would have been required to cause the separations necessary to transform it to an identifiable achondrite type. (Auth.)

E-35681

Powell, C.M., Veevers, J.J., **Namurian uplift in Australia and South America triggered the main Gondwanan glaciation,** *Nature,* Mar. 12, 1987 326(6109), p.177-179, 41 refs.

The Permo-Carboniferous glacigenic sediment at the base of the Gondwanan basins reflects the culmination of the glacial episode that started in Australia and southern South America in the Namurian, after two local episodes in northern South America and adjacent Africa in the Visean and latest Devonian. It is shown that the start of each episode was associated with orogenic uplift of the bordering regions: northern South America and adjacent Africa in the latest Devonian and Visean, and southern South America and eastern and central Australia in the Namurian. All areas, except southern South America in the Namurian, were at mid- (and not high) latitudes. Thus whereas the first order control of glaciation was the configuration of the continents and oceans during the closing of Palaeo-Tethys, orogenesis provided a second order control by the accumulation of ice about bordering uplifts during the three glacial episodes. (Auth.)

E-35707

Giret, A., Ghomshei, M.M., Cheminée, J.L., Nougier, J., **Uranium and thorium behavior in the Kerguelen alkaline lavas** [Comportement de l'uranium et du thorium dans les laves alcalines des îles Kerguelen (Océan Indien, TAAF)], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série 2,* July 15, 1984 299(5), p.239-244, In French with English summary. 23 refs.

DLC QD1.A26

Uranium and thorium evolve with a constant ratio (Th/U=4.6) in the lavas and in the plutonic rocks of Kerguelen Is. The increase of their proportions, slow during the magmatic stages and fast later on, suggests an important role of fluid phases. (Auth.)

E-35708

Giret, A., Beaux, J.F., **Plutonic massif of Val Gabbro (Kerguelen Is.), a tholeiitic complex related to the activity of the East-Indian paleoridge** [Le pluton du Val Gabbro (îles Kerguelen), un complexe tholéiitique témoin de l'activité de la paléo-ride Est-Indienne], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série 2,* Nov. 14, 1984 299(14), p.965-970, In French with English summary. 14 refs.

DLC QD1.A26

The plutonic complex of Val Gabbro is essentially made up by cumulative basic rocks which may be compared with the upper levels of the well-known tholeiitic continental intrusions of the Skaergaard and the Bushvelds complexes. Its isotopic age of 39 My allows us to consider that it represents a young stage of the building up to the Kerguelen Is. and to relate this magmatism to the activity of the East-Indian paleorift. (Auth.)

E-35749

Stock, J., Molnar, P., **Revised history of early Tertiary plate motion in the south-west Pacific,** *Nature,* Feb. 5-11, 1987 325(6104), p.495-499, 34 refs.

Reanalysis of Early Tertiary magnetic anomalies on the Pacific plate south of the Campbell Plateau indicates that in early Tertiary time there was a previously unrecognized triple junction of the Pacific, the Antarctic, and a third plate now beneath the Bellingshausen sea. Corresponding revised parameters for Pacific-Antarctica motion do not require Early Tertiary displacements within Antarctica or New Zealand, but suggest a change in direction of the Pacific plate over the hotspots or approximately the same sense and timing as the Hawaiian-Emperor bend. (Auth.)

E-35758

Evans, J.C., Reeves, J.H., **Al-26 survey of antarctic meteorites,** *Earth and planetary science letters,* Apr. 1987 82(3/4), p.223-230, 26 refs.

An Al-26 survey by non-destructive gamma ray spectrometry was conducted as part of the preliminary examination effort for antarctic

meteorites. A total of 220 samples were studied. The majority of the samples were from the Allan Hills area; however, samples from several other sites, including the Yamato Mountains, were studied. Compared to worldwide falls and finds, the Antarctic group shows a clear trend toward lower Al-26 levels. At least 10% of the samples studied were clearly undersaturated in Al-26. The frequency of undersaturated samples suggests that terrestrial ages of several hundred thousand years are common among the antarctic meteorite collection. The absence of samples with extremely low Al-26 implies that the upper limit for terrestrial ages in the Antarctic is on the order of 1 million years. (Auth.)

E-35759

Baker, E.W., Louda, J.W., **Porphyrin geochemistry of Atlantic Jurassic-Cretaceous black shales,** *Organic geochemistry,* 1986 10(4-6), p.905-914, Refs. p.912-914.

Late Jurassic-early Cretaceous black shales and an overlying sequence of Albian-Campanian zeolitic claystones from the Falkland Plateau (DSDP/IPOD Leg 71, Site 511) were analyzed for tetrapyrrole pigment type and abundance. The "black shale" sequence was found to be rich in DPEP-series dominated free-base, nickel (Ni) and, to a lesser extent, vanadyl (V=O) porphyrins. A low level of organic maturity (i.e. precatagenesis) is indicated for these strata as nickel chelation by free-base porphyrins is only 50-75% complete, proceeding down-hole to 627 m sub-bottom. Electronic and mass spectral data reveal that the proposed benzo-DPEP (BD) and tetrahydrobenzo-DPEP (THBD) series are present in the free-base and Ni species, as well as the more usual occurrence in V=O porphyrin arrays. Results from the present study are correlated to past analyses of Jurassic-Cretaceous sediments from Atlantic margins in an effort to relate tetrapyrrole quality and quantity to basin evolution and OM sources in the proto-Atlantic. (Auth. mod.)

E-35764

Renner, R.G.B., Bales, C.M., **Aeromagnetic survey of the Neny Fjord area, Graham Land, Antarctica,** *British Antarctic Survey. Bulletin,* May 1987 No.75, p.31-40, 22 refs.

The results of an aeromagnetic network over Neny Fjord are described. The survey was flown to investigate a possible offshore continuation of a topographic divide between Graham Land and Palmer Land, which may have structural significance. The data do not show any major geological disconformity but do reveal an active magnetic relief. Three-dimensional modelling indicates that near surface intrusions are responsible for two anomalies whose amplitudes approach 650 nT. The largest body has dimensions of 10 x 1.5 km and may extend from less than 2 km below sea level to depths of 20 km. Both bodies trend approximately northeast-southwest. The results imply magnetization contrasts of up to 9 A/m which are comparable with selected gabbros from Marguerite Bay. The anomalies all lie within a more extensive linear anomalous zone along the west coast of the Antarctic Peninsula. (Auth.)

E-35765

Pirrie, D., **Orientated calcareous concentrations from James Ross Island, Antarctica,** *British Antarctic Survey. Bulletin,* May 1987 No.75, p.41-50, 12 refs.

Calcareous concretions are abundant within fine-grained sediments of the Upper Cretaceous Marambio Group, Ross I. At one locality, over 300 concretions are exposed on a single bedding plane, showing a marked major axis orientation parallel to the palaeocurrent. The spatial distribution of the concretions was found to be non-random with concretions either showing the maximum spacing possible at the concretion densities observed, or being aligned into parallel rows at approximately right angles to the major axis orientation. This non-random distribution is possibly related to the occurrence of large scale bedforms, controlling the distribution of organic matter, and hence sites for concretion growth. (Auth.)

E-35766

Maslanyj, M.P., **Seismic bedrock depth measurements and the origin of George VI Sound, Antarctic Peninsula,** *British Antarctic Survey. Bulletin,* May 1987 No.75, p.51-65, 26 refs.

Seismic sounding has been used to determine bedrock depths beneath George VI Ice Shelf. A contour map and profiles illustrate the bedrock topography. The ice shelf is underlain by a deep steep-sided elongated trough trending N-S in the north and E-W in the south with bedrock depths exceeding 800 and 1000 m respectively. This supports the concept that George VI Sound is, in part, an extensional feature. Hydrographic soundings suggest that the rift-like feature extends north to at least lat 68 deg 30 S. The present setting of Alexander I. is explained in terms of crustal extension producing northwesterly movement relative to the Antarctic Peninsula. In southern George VI Sound rifting developed sub-parallel to the continental margin whereas in the north it formed discordantly to the margin and possibly along an older tectonic boundary. (Auth. mod.)

E-35768

Milne, A.J., **Report on antarctic fieldwork. The geology of southern Oscar II Coast, Graham Land,** *British Antarctic Survey. Bulletin,* May 1987 No.75, p.73-81, 18 refs.

Southern Oscar II Coast is the only area in Graham Land where exposures of Palaeozoic basement rocks are known. Three types of basement rock are present: granitic *ortho*-gneiss, migmatitic banded gneiss and metasedimentary rocks. These are intruded and unconformably overlain respectively by undeformed plutonic and volcanic rocks of the Mesozoic magmatic arc suite. Eastward-dipping normal faulting and quartz-feldspar-porphyry dyke emplacement may also be related to the same magmatic episode. (Auth.)

E-35769

Glacial history of Antarctica. Ocean Drilling Program Leg 113 shipboard scientific party, *Nature,* July 9, 1987 328, p.115-116.

During Leg 113 of the Ocean Drilling Program, 9 sites were drilled in the Weddell Sea, representing a wide range of sedimentary environments. Drilling results from these sites provide a rich database on the environmental history of Antarctica and the adjacent ocean from the early Cretaceous (120 Myr ago) to the present. Salient features of that history are outlined particularly in reference to the following questions: when did the Antarctic ice sheets first form, and have they since been permanent? How did surface- and intermediate-water temperatures change in response to Antarctic glacial development? When did marine glacial conditions develop sufficiently for initiation of antarctic bottom water formation in the Weddell Sea? How did planktonic productivity in the Weddell Sea sector of the southern ocean evolve, and is this development linked to the evolution of antarctic climate and the oceanic environment, particularly the polar front?

E-35776

Elliot, D.H., **Southern ocean drilling: the South Atlantic and Indian Ocean sectors,** *Polar record,* May 1987 23(146), p.613-621, 15 refs. SCAR bulletin No.86, May 1987.

The details of the Ocean Drilling Program, legs 113 and 114, which got underway in Jan. 1985 in the Weddell Sea and the South Atlantic Subantarctic, respectively, are presented. The broad objectives for these two legs are the Mesozoic and Cenozoic evolution of the paleoenvironments in the Indian Ocean sector of the southern ocean and the origin and tectonic evolution of the Kerguelen Plateau. Some administrative aspects of the Program are discussed.

E-35778
McKenzie, G.D., ed, **Gondwana Six: structure, tectonics, and geophysics,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, 323p., Refs. passim. For selected papers see E-35781 through E-35788, E-35790 through E-35801, L-35779, L-35780, and L-35789.

This volume contains many of the papers presented at the Sixth International Gondwana Symposium, held at the Institute of Polar Studies, The Ohio State University, Columbus, Ohio, August 19-23, 1985. The symposium attracted 150 scientists from 19 countries; the focus of the meetings was on Antarctica, with 45% of the 102 papers covering the Ross Sea sector, West Antarctica, and northern Victoria Land. The 56 papers are presented in two volumes; the papers in this volume include 23 that relate to Antarctica. The authors present results of recent fieldwork and the geological, geophysical, and geochemical data that provide support for an improved understanding of the sedimentary basins, magmatism, tectonics, and paleogeography of the region.

E-35781
Lawver, L.A., Scotese, C.R., **Revised reconstruction of Gondwanaland,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.17-23, Refs. p.22-23.

A revised reconstruction of Gondwana is presented. It is based on previous reconstructions that were geologically well constrained and utilizes marine magnetic anomalies and recent paleomagnetic results as additional constraints. Three areas of conflict, namely, the position of Madagascar, the location of India-Sri Lanka, and the overlap of the Antarctic Peninsula with the Falkland Plateau are discussed. An interactive graphics terminal was used to minimize continental overlap while reducing obvious gaps between prebreakup components. Poles and angles of rotation were determined directly from the optimal geometric fit. (Auth.)

E-35782
Wright, T.O., Brodie, C., **Handler Formation, a new unit of the Robertson Bay Group, northern Victoria Land, Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.25-29, 12 refs.

The Robertson Bay Group occupies a large area along the Ross Sea, and new information allows the stratigraphic subdivision of the group. The Handler Formation is defined as a sequence of quartzose sandstones, gray slate with minor red slate, and pebbly mudstone and megaconglomerate that constitutes the upper stratigraphic part of the Robertson Bay Group. Its lower contact is gradational with the lower part of the Robertson Bay Group, which remains undivided, and is distinguished from it primarily by the presence of red slate and pebbly mudstone beds. At the type section, Handler Ridge, the top of the sequence is truncated by a thrust fault that places the Bowers Supergroup on top structurally. The age of the Handler Formation is constrained by the presence of fossils of youngest Cambrian/oldest Ordovician age in limestone olistoliths. This maximum age applies to the upper part of the Handler Formation; the age of the lower part and the underlying Robertson Bay Group is not well constrained paleontologically. The Handler Formation rocks are strongly folded and cleaved; total thickness is estimated at several thousand meters. The Handler Formation also occurs in a strip along the east side of the Victory Mountains for approximately 70 km north of Handler Ridge and in the Mirabito and Admiralty ranges. (Auth. mod.)

E-35783
Kreuzer, H., **Radiometric ages of pre-Mesozoic rocks from northern Victoria Land, Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.31-47, Refs. p.45-47.

Northern Victoria Land forms the Pacific end of the Transantarctic Mountains. Three major thrust-bounded terranes are distinguished. The Wilson Terrane, with low- to high-grade partly polyphase metamorphics, is in the west; the Robertson Bay Terrane, with low-grade metaturbidites, is in the east; and squeezed between these two, with indications of a suture zone at the margin of the western terrane, is a third, the narrow Bowers Terrane, with a low-grade metamorphic regressive Cambrian sequence of volcanics and marine to fluviatile sediments. All three terranes were affected by early Ordovician events. A common history is possible for all three terranes since the Ordovician. Permian Beacon sediments and Jurassic Ferrar Dolerites in the western, the Bowers, and the Wilson terranes indicate that the three terranes were thrust together at least in the late Paleozoic. (Auth. mod.)

E-35784
Findlay, R.H., **Review of the problems important for interpretation of the Cambro-Ordovician paleogeography of northern Victoria Land (Antarctica), Tasmania, and New Zealand,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.49-66, Refs. p.63-66.

The Cambrian to Ordovician tectonics of northern Victoria Land may be explained in terms of a plate tectonic collision involving three terranes: the western foreland Wilson Terrane, the central island arc Bowers Terrane, and the eastern turbidite fan sequence of the Robertson Bay Terrane. The Cambro-Ordovician tectonics of Tasmania differ in that they were dominated by rifting, closure of rifts, and uplift. Likewise, although lithologies in the two regions are superficially comparable, the important units in either one of the regions cannot be identified in the other. New Zealand poses special problems. It contains Cambro-Ordovician sequences comparable to those in northern Victoria Land and Ordovician-Devonian sequences similar to those in Tasmania. It is concluded that the three regions formed part of a tectonically linked system of Cambrian island arcs and rifted microcontinents which, in Late Cambrian and Early Ordovician times, collided with the then eastern margin of Gondwana (eastern Antarctica-South Australia). A subsequent Siluro-Devonian orogeny occurred along this newly accreted eastern margin of Gondwana. (Auth. mod.)

E-35785
Borg, S.G., Stump, E., **Paleozoic magmatism and associated tectonic problems of northern Victoria Land, Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.67-75, Refs. p.74-75.

The division of northern Victoria Land (NVL) into three north-northwest trending terranes is underscored by recent chemical and isotopic studies of the Paleozoic granitoids of the region. Early Paleozoic Granite Harbour Intrusives are found only in the (western) Wilson Terrane (WT), best interpreted as a continuation of the Ross Orogenic Belt, which developed along the margin of the East Antarctic Craton. Devonian Admiralty Intrusives, however, are found only within the (central) Bowers Terrane (BT) and the (eastern) Robertson Bay Terrane (RBT), and studies of chemical polarity indicate that these terranes are fragments of an allochthonous crustal block. In view of the key position occupied by NVL in reconstructions of Antarctica and Australia, recognition of the relationships outlined above

raises important questions about the assembly and perhaps the breakup of this portion of Gondwana. Timing of juxtapositioning of the BT + RBT against the WT is problematic but is thought to have occurred after emplacement of the Devonian Admiralty Intrusives and must have occurred prior to deposition of the Beacon Supergroup in the Permian. (Auth. mod.)

E-35786

Stump, E., **Construction of the Pacific margin of Gondwana during the Pannotios cycle,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.77-87, Refs. p.84-87.

A cycle of sedimentation and tectonism affected the supercontinent of Gondwana from the middle or late Proterozoic until its culmination at approximately 500 Ma. This paper is a synthesis of the activity that occurred along the Pacific margin of the supercontinent in portions of present-day South America, Africa, Antarctica, and Australia. The cycle began at approximately 900 Ma with sedimentation in basins bounded and, in many cases, floored by older cratonic basement. Tectonism began in the late Precambrian in a zone from the Ribeira and Damara belts of South America and southern Africa through to the central Transantarctic Mountains. A narrow septum of cratonic rocks, unaffected by late Precambrian tectonism, is postulated to have extended from the Haag Nunataks in Antarctica through the Falkland Is. to the Rio de la Plata craton in South America. The name Pannotios is proposed as a unifying term to encompass the late Precambrian-early Paleozoic cycle of activity that occurred throughout Gondwana. (Auth. mod.)

E-35787

Kleinschmidt, G., Tessensohn, F., **Early Paleozoic westward directed subduction at the Pacific margin of Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.89-105, Refs. p.102-105.

The tectonic history of the Antarctic continent during the Phanerozoic is best considered as part of the development of the circum-Pacific mobile belts. In early Paleozoic time, the continental margin at the Pacific side of Antarctica formed a 3000-km-long segment of the active Gondwana margin, which also includes Australia and parts of South Africa and South America. In the antarctic segment, north Victoria Land forms one of the best exposed and investigated areas. This paper develops a plate tectonic reconstruction for this area based on several different lines of evidence: plate tectonic implications of paired metamorphic belts, granite types, submarine volcanism, a subduction complex, sedimentary basins, and thrust belts. It is concluded that a continuous westward directed subduction of oceanic crust under the East Antarctic craton has proceeded from the Early Cambrian to the Late Devonian. Three main episodes are documented by different criteria. (Auth. mod.)

E-35788

Dalziel, I.W.D., Pankhurst, R.J., **Joint U.K.-U.S. west antarctic tectonic project: an introduction,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.107-108, 18 refs.

The relationship of West Antarctica to the Precambrian craton of East Antarctica is the longest standing major tectonic problem in antarctic geology. It has a bearing on Gondwanaland reconstruction but has even more important geotectonic, paleoenvironmental, and paleobiogeographic implications. A joint United Kingdom-United States project was initiated in 1980-1981 to study certain aspects of the overall problem. Major field programs were undertaken in the 1983-1984 and 1984-1985 antarctic seasons. Additional efforts will be made in 1986-1987 and 1987-1988. This contribution briefly introduces several accompanying papers describing the preliminary results of geological, geophysical, and geochemical aspects of the project as well as a preliminary tectonic synthesis based on the work completed at the time of the Sixth Gondwana Symposium. (Auth.)

E-35790

Storey, B.C., Dalziel, I.W.D., **Outline of the structural and tectonic history of the Ellsworth Mountains—Thiel Mountains ridge, West Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.117-128, Refs. p.127-128.

The Ellsworth Mountains-Thiel Mountains ridge and adjoining areas are divided into three tectonic provinces: Haag Nunataks, Thiel Mountains, and Ellsworth-Whitmore Mountains crustal block. Haag Nunataks are part of a Precambrian tectonic province the overall extent of which is not clearly known. The Thiel Mountains are part of a distinctive Transantarctic Mountains province that is separated by a major tectonic break from deformed sedimentary rocks of the Ellsworth-Whitmore Mountains crustal block. The crustal block is divided, on the basis of a detailed structural analysis, into two domains: the Ellsworth and Marginal domains. The sedimentary rocks throughout the Ellsworth domain are correlated with parts of the Paleozoic succession forming the Ellsworth Mountains themselves. The tectonic significance of the Marginal domain is discussed but is not clearly understood. (Auth. mod.)

E-35791

Vennum, W.R., Storey, B.C., **Correlation of gabbroic and diabasic rocks from the Ellsworth Mountains, Hart Hills, and the Thiel Mountains, West Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.129-138, Refs. p.137-138.

Gabbroic stocks and/or diabasic sills crop out in the southern Heritage Range of the Ellsworth Mountains, in the Hart Hills 400 km southwest of the Ellsworth Mountains, and in the Thiel Mountains 200 km south of the Hart Hills. In the Ellsworth Mountains and Hart Hills these mafic igneous rocks have undergone pumpellyite-actinolite and/or greenschist facies regional metamorphism. Relic clinopyroxene compositions, alteration-resistant trace elements, rare earth element data, and the nature of intruded sedimentary host rocks suggest the following: gabbroic stocks and diabasic dikes and sills in the southern Ellsworth Mountains were emplaced in a continental area undergoing extensional tectonism and are geochemically dissimilar to both the Ferrar Supergroup of the Transantarctic Mountains and the Hart Hills sill; an unmetamorphosed diabase sill at Lewis Nunatak is correlative with the Ferrar Supergroup; and the Hart Hills sill does not appear to have been emplaced in a within-plate setting, but no further resolution of its tectonic environment is possible. (Auth. mod.)

E-35792

Vennum, W.R., Storey, B.C., **Petrology, geochemistry, and tectonic setting of granitic rocks from the Ellsworth-Whitmore Mountains crustal block and Thiel Mountains, West Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.139-150, Refs. p.148-150.

Granitic rocks compose most of the Pirrit Hills, Nash Hills, and Whitmore Mountains, and all of Pagano Nunatak. Mount Woollard is a migmatized complex of biotite schist, amphibolite, pegmatite, and massive biotite granite. A rhyodacite stock crops out in the Martin Hills. The Mount Seelig hornblende-bearing biotite granite of the Whitmore Mountains and the Mount Woollard biotite granite are

metaluminous diopside-normative granitoids. All other granitic rocks of the Ellsworth-Whitmore Mountains (EWM) are mildly peraluminous, corundum-normative biotite (locally muscovite-bearing) leucogranites. Petrography, geochemistry, and isotopic data suggest that these rocks are largely highly differentiated leucocratic S-type granites formed by anatexis of either metasedimentary rocks or more deeply seated, more mafic, plagioclase-rich granitoids. Their origin is ascribed to post-tectonic emplacement in a neutral or extensional (rifted) within-plate setting following deformation of the EWM. S-type Cambro-Ordovician granitic rocks and Precambrian quartz monzonite porphyries of the Thiel Mountains are geochemically similar to the EWM granites, but are correlative with the Granite Harbour Intrusive Series of the Transantarctic Mountains and the Wyatt Formation of the nearby La Gorce Mountains, respectively. (Auth. mod.)

E-35793

Millar, I.L., Pankhurst, R.J., **Rb-Sr geochronology of the region between the Antarctic Peninsula and the Transantarctic Mountains: Haag Nunataks and Mesozoic granitoids,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.151-160, 22 refs.

Seventy-two new Rb-Sr whole-rock analyses are reported for Haag Nunataks, Mount Woollard, the Whitmore Mountains, the Pirrit and Nash hills, and Pagano Nunatak. For Haag Nunataks, three isochrons for gneisses and later aplogranite and mircogranite sheets establish the age of crustal formation as 1000-1100 Ma. No other basement rocks of this age are known from the Antarctic Peninsula or Ellsworth Land. Results from the migmatite-pegmatite complex at Mount Woollard are inconclusive but do not suggest that this represents Precambrian crystalline basement. Provisional results for the Whitmore Mountains granites are compatible with crystallization of all components within error of a 182 Ma isochron for fine-grained microgranite. The granites of the Ellsworth-Thiel mountains ridge are well dated as Middle Jurassic by the new data: Pirrit Hills 173 Ma, Nash Hills 175 Ma, and Pagano Nunatak 175 Ma. The dolerite of Lewis Nunatak is shown by its Rb, Sr, and Sr-87/Sr-86 composition to be a member of the Jurassic Ferrar Supergroup. (Auth. mod.)

E-35794

Grunow, A.M., Dalziel, I.W.D., Kent, D.V., **Ellsworth-Whitmore Mountains crustal block, western Antarctica: new paleomagnetic results and their tectonic significance,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.161-171, Refs. p.170-171.

Preliminary paleomagnetic study of granitic and sedimentary rocks from the Ellsworth-Whitmore Mountains crustal block (EWM), West Antarctica, leads to the following conclusions: the EWM has a paleopole for the Middle Jurassic located at 235 E, 41 S; Middle Jurassic paleolatitude of 47 S is indicated for the sites and precludes an original location for the EWM block south of the Antarctic Peninsula crustal block (AP); this pole is not significantly different from the previously published Middle Jurassic paleopole obtained from rocks of the northern Antarctic Peninsula; the combined AP-EWM paleopole, compared to the Middle jurassic mean paleopole obtained from igneous rocks of the Ferrar Supergroup in East Antarctica, suggests about 15 deg tectonic clockwise rotation of the AP and EWM; since the AP and EWM poles coincide, these two crustal blocks may have moved as one unit since the Middle Jurassic; the new data are compatible with two different Gondwanaland reconstructions; enigmas concerning the structural trend and isolation of the thick Ellsworth Mountains Paleozoic succession persist. (Auth. mod.)

E-35795

Dalziel, I.W.D., **Ellsworth-Whitmore Mountains crustal block: its role in the tectonic evolution of West Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.173-182, Refs. p.181-182.

The 1983-1984 season of the joint British Antarctic Survey-U.S. Antarctic Research Program geology and geophysics project on the Ellsworth-Whitmore Mountains crustal block (EWM) has yielded new observations and laboratory data relevant to the geological evolution of West Antarctica and its tectonic relationship to the rest of Gondwanaland. This is a synthesis of results presented in companion papers in this volume. New paleomagnetic data favor a Jurassic reconstruction in which there has been little or no relative displacement between the EWM and the Antarctic Peninsula. The Mesozoic-Cenozoic history of the EWM is recorded in geophysical evidence for crustal rifting and extension, some of which may be related to the migration of West Antarctic crustal blocks to their present positions, others of which are probably very young features related to Cenozoic alkali magmatism outside the EWM and the recent marked uplift of the Ellsworth Mountains. (Auth. mod.)

E-35796

Laudon, T.S., Lidke, D.J., Delevoryas, T., Gee, C.T., **Sedimentary rocks of the English Coast, eastern Ellsworth Land, Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.183-189, 25 refs.

Nunataks scattered over 16,000 sq km of the western English Coast along the Bellingshausen Sea are the westernmost rock exposures of the Antarctic Peninsula tectonic province. The nunataks are composed of sedimentary rocks of probable Paleozoic, Mesozoic, and probable Mesozoic age, volcanic and plutonic rocks of probable Mesozoic age, and basaltic volcanic and volcaniclastic rocks of probable late Cenozoic age. Most rocks exposed on the English Coast are correlatable with Mesozoic and Cenozoic units which occur in the Orville Coast and the Lassiter Coast regions to the east. One outcrop in the English Coast consists of sedimentary rocks containing fossil plants including abundant *Glossopteris* leaves and fragments of *Phyllotheca* and *Equisetum.* The age of the rocks is probably Permian, significantly older than the oldest previously dated rocks (Middle Jurassic) from the southern Antarctic Peninsula. This is the first reported occurrence of *Glossopteris* from the Antarctic Peninsula province and the second reported occurrence from West Antarctica. (Auth. mod.)

E-35797

Storey, B.C., Thomson, M.R.A., Meneilly, A.W., **Gondwanian orogeny within the Antarctic Peninsula: a discussion,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.191-198, Refs. p.196-198.

The relevance of the term "Gondwanian orogeny" to deformation within upper Paleozoic to Mesozoic rocks of the Antarctic Peninsula is reviewed, and the tectogenesis of deformation within this time frame is discussed. The term, originally applied by du Toit to deformation of middle Paleozoic to lower Mesozoic rocks in the Samfrau geosyncline, has been used extensively in antarctic literature. However, the Gondwanian fold belt includes deformed regions of significantly different ages. The authors favor the use of the term "Peninsula orogeny" for deformation of Triassic and Early Jurassic rocks below the "Peninsula unconformity" in preference to the term Gondwanian orogeny. (Auth. mod.)

E-35798
Smellie, J.L., **Sandstone detrital modes and basinal setting of the Trinity Peninsula Group, Northern Graham Land, Antarctic Peninsula: a preliminary survey,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.199-207, Refs. p.206-207.

Sandstone detrital modes for a representative sample of the Trinity Peninsula Group in northern Graham Land are described and assessed. Whereas the volumetrically dominant quartz and feldspar were derived principally from erosion of a plutonic and high-rank metamorphic terrane, the lithic population was derived mainly from a volcanic cover. The data clearly indicate the presence of two major sandstone suites (petrofacies I and II) with distinctive and probably separate provenances. Further scope for subdivision is limited by the small sample set, but four petrofacies may be present, three of which correspond with previously described lithostratigraphical units (Legoupil, Hope Bay, and View Point formations). The sample distribution and detrital modes enable approximate geographical limits to be assigned to each petrofacies for the first time, although the nature of the boundaries (stratigraphical or structural) is unknown. (Auth. mod.)

E-35799
Meneilly, A.W., Harrison, S.M., Piercy, B.A., Storey, B.C., **Structural evolution of the magmatic arc in northern Palmer Land, Antarctic Peninsula,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.209-219, Refs. p.218-219.

In northern Palmer Land the magmatic arc has developed by the interaction of compressional and extensional tectonics. Periods of magmatism and arc compression in the Early Jurassic and Early to middle Cretaceous separate periods of arc and backarc extension in the Middle to Late Jurassic and Tertiary. Sheeted migmatite complexes and orthogneiss are mostly Jurassic arc plutons emplaced into older paragneiss. Heterogeneous regional deformation produced major shear zones, and the orientation of shear zones, foliation, and banding describe a fan diverging upward from the center of the arc. Mafic dikes and steep extensional shear zones throughout northern Palmer Land and thick amygdaloidal basalt sheets in northeastern Palmer Land are related to Jurassic extension of the arc and formation of a backarc basin filled by thick clastic sediments (Mount Hill and Latady formations). The arc and backarc were intensely deformed during the Cretaceous. Previously, the metamorphic rocks in northern Palmer Land were considered as part of a pre-late Paleozoic basement or as the roots of the Gondwanian orogen. Most of them are now shown to be deformed plutons of the Mesozoic magmatic arc. (Auth. mod.)

E-35800
Spaeth, G., **Aspects of the structural evolution and magmatism in western New Schwabenland, Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.295-307, Refs. p.306-307.

Data and observations on rock units of the northern Kraul Mountains (Vestfjella) and the Ahlmann Ridge in western New Schwabenland (western Queen Maud Land) are presented. The numerous dolerite dikes of both regions, which are apparently of Mesozoic age, indicate crustal extension. The majority have been intruded parallel to observed or assumed major fracture zones which dissect this part of the western edge of the East Antarctic Shield. These dolerite dikes and related sills are chemically similar to the basaltic lava flows of the Kraul Mountains. For this reason and because of the relationship between the dikes and the Permo-Carboniferous sedimentary rocks (Beacon Supergroup), they are regarded as Mesozoic and equivalent to the Jurassic volcanic rocks of the Transantarctic Mountains. Dissection of the crust of the antarctic continent and shelf at the eastern edge of the Weddell Sea, shown by fracture tectonics, may be related to the opening of the Weddell Sea and a failed rift during the fragmentation of Gondwana. Geochemical, petrographic, and structural investigations on presumed Mesozoic dolerite dikes and the basaltic-andesitic lavas of late Precambrian age on the Ahlmann Ridge demonstrate the difference in age of these magmatic events. (Auth. mod.)

E-35801
Shiraishi, K., Hiroi, Y., Motoyoshi, Y., Yanai, K., **Plate tectonic development of Late Proterozoic paired metamorphic complexes in eastern Queen Maud Land, East Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.309-318, Refs. p.316-318.

Two Proterozoic metamorphic complexes of the West Antarctic Shield are exposed in eastern Queen Maud Land: Yamato-Belgica and Lützow-Holm to the southwest and northeast, respectively. In the Yamato-Belgica complex, igneous activity is widespread. The metamorphic portions of this complex consist mainly of amphibolite facies rocks. Granulite facies rocks occur locally and are partly included in a syenitic intrusive. The granulite facies rocks belong to the low-pressure type. The regional metamorphism of the dominantly metasedimentary Lützow-Holm Complex is of the medium-pressure type, grading progressively from upper amphibolite facies to granulite facies toward the southwest. There is textural evidence of prograde recrystallization. It is inferred that the Yamato-Belgica and Lützow-Holm complexes form paired metamorphic complexes and that the latter was formerly situated in a subduction zone. The chemical compositions of metamorphosed ultrabasic and basic rocks occurring mainly in the western part of the Lützow-Holm Complex resemble those of cumulate rocks associated with ophiolites; they are possibly fragments of oceanic crust which were tectonically fractured and emplaced into the sedimentary pile prior to regional metamorphism. A plate tectonic model would be the most suitable interpretation for the development of the late Proterozoic metamorphic complexes in the region. (Auth. mod.)

E-35803
McKenzie, G.D., ed, **Gondwana Six: stratigraphy, sedimentology, and paleontology,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, 250p., Refs. passim. For selected papers see E-35804 through E-35812.

This volume contains many of the papers presented at the Sixth International Gondwana Symposium, held at the Institute of Polar Studies, The Ohio State University, Columbus, Ohio, August 19-23, 1985. The symposium attracted 150 scientists from 19 countries. The 56 papers are presented in two volumes; the papers in this volume, 10 of which are pertinent to Antarctica, deal with paleontological and biostratigraphical topics and cover many regions, including Australia, New Zealand, Asia, India, Africa, and Madagascar, often exploring the biogeographical connections between them.

E-35804
Dickins, J.M., Shah, S.C., **Relationship of the Indian and western Australian Permian marine faunas,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, Gondwana Six: stratigraphy, sedimentology, and paleontology. Edited by G.D. McKenzie, p.15-20, 33 refs.

Reconstructions for Permian maps are presented and discussed. In the Runnegar reconstruction, Peninsular India is shown immediate-

ly adjacent to Antarctica; it is pointed out that this part of Antarctica appears to have no representation of the Permian and later Gondwana sequences of Peninsular India. It is concluded that even western Australia was unlikely to have been close to India during the Permian.

E-35805

Retallack, G.J., **Triassic vegetation and geography of the New Zealand portion of the Gondwana supercontinent,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, Gondwana Six: stratigraphy, sedimentology, and paleontology. Edited by G.D. McKenzie, p.29-39, Refs. p.37-39.

Since the main geological elements of New Zealand were already assembled by Cretaceous time, when it was juxtaposed against Antarctica, a review is presented in this paper of what is known about Triassic plants and their environment in New Zealand as constraints for understanding its paleogeography and tectonic development. The distribution of the Middle Triassic marine fossils and fossil plant associations are discussed and presented on a modern map of the South Pacific Ocean.

E-35806

Young, G.C., **Devonian vertebrates of Gondwana,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, Gondwana Six: stratigraphy, sedimentology, and paleontology. Edited by G.D. McKenzie, p.41-50, Refs. p.47-50.

Devonian vertebrate localities are summarized for Paleozoic Gondwana, including Antarctica and other areas (Armorica, Kolyma, China, and southeast Asia) which may have been connected to it during the Devonian. Marine and nonmarine faunas on all the major continents are distributed mainly around the margins of a Gondwana reconstruction, in paleolatitudes ranging from equatorial to south polar. Faunas are still poorly known, but biogeographic affinities already indicated are broadly consistent with current Gondwana reconstructions. Highly endemic Gondwana faunas include marine occurrences of Emsian and Frasnian age, which represent times of major transgression. (Auth. mod.)

E-35807

Collinson, J.W., Kemp, N.R., Eggert, J.T., **Comparison of the Triassic Gondwana sequences in the Transantarctic Mountains and Tasmania,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, Gondwana Six: stratigraphy, sedimentology, and paleontology. Edited by G.D. McKenzie, p.51-61, Refs. p.60-61.

Triassic sedimentary sequences in the Transantarctic Mountains and Tasmania are both dominated by fluvial sandstones. Triassic exposures in Antarctica occur in three separate areas along the Ross Sea sector, one in the central Transantarctic Mountains and the other two in Victoria Land. In detail the Antarctic sequences and the Tasmanian sequence are different and cannot be correlated lithologically, but paleocurrent vectors and the distribution of the fluvial facies and detrital constituents suggest that they could have been deposited in a single foreland basin. This foreland basin, the Nilsen-Mackay Basin, was a trough-shaped depression between the East Antarctic craton and the Gondwanian orogen. A major river system may have flowed along the axis of this basin toward Tasmania. Three major types of fluvial facies are represented: braided, meandering, and transitional. Detrital constituents indicate source terranes of sedimentary, crystalline, and volcanic rocks. Tributaries from the East Antarctic craton were dominated by quartz sand. A large influx of volcanic detritus was supplied by tributaries from a calc-alkaline arc complex along the Pacific margin. The axis of the basin migrated toward the craton as the influx of volcanics increased during the Triassic. (Auth. mod.)

E-35808

Zeller, E.J., Dreschhoff, G.A.M., **Radioactive minerals and the pre-Beacon erosion surface, Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, Gondwana Six: stratigraphy, sedimentology, and paleontology. Edited by G.D. McKenzie, p.63-72, Refs. p.71-72.

Some similarities between Antarctica and other fragments of Gondwanaland have been revealed by a radiometric survey conducted in the Transantarctic Mountains. The survey examined in detail both the primary radioactive mineralization in the crystalline terranes upon which the pre-Beacon erosion surface is formed and the sediments that rest upon it. The primary deposits associated with the Granite Harbour Intrusives show similarities, both in age and petrology, to the Rossing uranium deposits in South West Africa (Namibia). Placer deposits of thorium-bearing minerals were found in the Brown Hills Conglomerate in the Darwin Glacier area, but only minor concentrations of uranium were detected in any of the basal Beacon sediments. In southern Victoria Land, outcrops of the Kukri Erosion Surface commonly occur on steep slopes and cliff faces. The radiation signature of different outcrops varies considerably, but some show uranium and thorium concentrations as high as those found in the Darwin Glacier area or in northern Victoria Land. Very extensive exposures of the pre-Beacon surface in northern Victoria Land were found to show uranium in the outliers of the basal Beacon sandstones at several localities where these sediments have been preserved. (Auth. mod.)

E-35809

Hammer, W.R., **Paleoecology and phylogeny of the Trematosauridae,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, Gondwana Six: stratigraphy, sedimentology, and paleontology. Edited by G.D. McKenzie, p.73-83, Refs. p.82-83.

The component species of the labyrinthodont family Trematosauridae are analyzed in light of a family diagnosis which contains only shared derived features. Morphological and depositional evidence suggests that this group contains free swimming euryhaline carnivores which favored deltaic to shallow marine conditions. Trematosaurs have been reported from Scythian age deposits of all the continents except South America and Antarctica. The lack of Scythian depositional environments of the type typical for the family may explain the absence of the group in the Antarctic. (Auth. mod.)

E-35810

Macellari, C.E., **Progressive endemism in the Late Cretaceous ammonite family Kossmaticeratidae and the breakup of Gondwanaland,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, Gondwana Six: stratigraphy, sedimentology, and paleontology. Edited by G.D. McKenzie, p.85-92, Refs. p.90-92.

The Late Cretaceous ammonite family Kossmaticeratidae had a distribution mostly restricted to the margins of Gondwana. The progressively endemic character of this family can be explained in terms of plate movements and the fragmentation of Gondwana. Members of the Kossmaticeratidae appeared in the Turonian of India. As India migrated north and South Africa separated from South America during Campanian time, kossmaticeratid faunas, which were probably adapted to cooler waters, gradually disappeared at these localities and became progressively endemic. A major period of diversification occurred during the late Campanian-Maastrichtian in the Weddellian Province which embraced the shallow seas off Patagonia, the Antarctic Peninsula, New Zealand, and New Caledonia. This increased endemism and dominance of the Kossmaticeratidae is clearly displayed in the ammonite faunas from Patagonia and the

Antarctic Peninsula where the proportion of its components in relation to the total ammonite fauna increased linearly from the early Campanian to the Maastrichtian. (Auth. mod.)

E-35811

Crame, J.A., **Late Mesozoic bivalve biogeography of Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, Gondwana Six: stratigraphy, sedimentology, and paleontology. Edited by G.D. McKenzie, p.93-102, Refs. p.99-102.

Throughout the late Mesozoic a distinctive bivalve fauna can be traced around the southern Gondwana margins. It is characterized by inoceramids *(Retroceramus, Inoceramus, Anopaea),* oxytomids *(Malayomaorica, Arctotis, Aucellina, Maccoyella),* and buchiids *(Jeletzkiella, Australobuchia?),* together with certain other types such as monotids and trigoniids. Throughout much of this period the fauna appears to have been centered on a core region which stretched approximately between southern Patagonia and Indonesia. The presence of a distinct austral bivalve fauna suggests that there may well have been some form of climatic zonation at high latitudes in the Southern Hemisphere. Support for this claim comes from the phenomenon of bipolarity which is well defined in several Late Jurassic and Early Cretaceous genera. The existence of an abundant late Mesozoic bivalve fauna in Antarctica further underlines the importance of polar regions as potential evolutionary and dispersal centers. (Auth. mod.)

E-35812

Le Roux, J.P., Toens, P.D., **Permo-Triassic uranium deposits of Gondwanaland,** *American Geophysical Union. Geophysical monograph series,* 1987 No.41, Gondwana Six: stratigraphy, sedimentology, and paleontology. Edited by G.D. McKenzie, p.139-146, Refs. p.145-146.

The world's uranium provinces are time bound and occur in five distinct periods ranging from the Proterozoic to the Recent. One of these periods embraces the time of Gondwana sedimentation and probably is related to the proliferation of land plants from the Devonian onward. Uranium occurrences of Gondwana age are of four main types: sandstone-hosted, coal-hosted, pelite-hosted, and vein-type deposits. Sandstone-hosted deposits commonly occur in fluviodeltaic sediments found, among others, in Victoria Land, and are related to the presence of organic matter. These deposits commonly are enriched in molybdenum and other base metal sulfides. (Auth. mod.)

E-35859

Valle, R.A. del, Fourcade, N.H., **Post-Triassic sedimentary basin in the northeastern end of the Antarctic Peninsula** [La cuenca sedimentaria post-triásica del extremo nororiental de la península Antártica], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1986 No.323, 24p., In Spanish with English, German and French summaries. Refs. p.22-24.

In the northeastern end of the Antarctic Peninsula there is a post-Triassic sedimentary basin of approximately 6.4 km in maximum sedimentary thickness, established by geophysical methods and with stratigraphical control. Within this basin, which developed behind a magmatic arc between the Jurassic and the Oligocene, the accumulations were produced through four sedimentary cycles: cycle I (Upper Jurassic-Lower Cretaceous); cycle II (High Lower Cretaceous); cycle III (Upper Cretaceous); and cycle IV (Paleogene). At some 100 km from the western border of the basin, sedimentary thicknesses of the order of 6.4 km have been established, the lithological column consisting of 2 superposed layers, a lower one, 2 km thick, corresponding to the accumulations of cycles I and II, and an upper layer corresponding to the combined deposits of cycles III and IV, some 4.5 km in thickness. (Auth. mod.)

E-35861

Scasso, R.A., Valle, R.A. del, Ambrosini, G., **Lithology and paleoenvironment of Cretaceous sediments of the Troilo Nunatak, Tabarin Peninsula** [Caracterización litológica y paleoambiental de las sedimentitas cretácicas del Nunatak Troilo, Península Tabarín, Antártida], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1986 No.328, 15p., In Spanish with English, French and German summaries. 32 refs.

The sedimentary sequence of the Troilo Nunatak, located near the west coast of Tabarin Peninsula, is described. The beds are composed of mudstone, sandstone and conglomerates with some interbedded tuffs. On the basis of fossiliferous content, lithology, sedimentary structures and geometry of the deposits, a fan-delta environment is proposed for the deposition of the studied sequence. An Upper Lower Cretaceous age is assigned to these beds supported by fossils and lithology correlation with formation outcropping at different sectors of the basin. (Auth.)

E-35862

Olivero, E., Scasso, R.A., Rinaldi, C.A., **Revision of the Marambio Group, James Ross Island, Antarctica,** *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1986 No.331, 28p., 39 refs.

A new lithostratigraphic unit, Santa Marta Formation, is defined within the Marambio Group (Cretaceous-Lower Tertiary) on the northwestern border of James Ross I. The rocks of this unit were formerly assigned to the López de Bertodano Formation (Marambio Group). However, from recent studies, it is evidenced that its lithostratigraphic features differ from those of the latter Formation. This justifies the designation of a new unit, i.e. Santa Marta Formation, that is stratigraphically underlying the López de Bertodano Formation. The rocks are friable silty sandstones and pelites with concretions and intercalations of conglomeratic sandstones and conglomerates. They contain an abundant marine invertebrate fauna, silicified wood remains and carbonaceous levels. Well-preserved marine vertebrate bones were also found. The fauna reported may be assigned to the Campanian with a probable Santonian basal section near the contact with the underlying unit (Hidden Lake Formation). (Auth. mod.)

E-35893

Parrish, J.M., Parrish, J.T., Ziegler, A.M., **Permian-Triassic paleogeography and paleoclimatology and implications for therapsid distribution,** Ecology and biology of mammal-like reptiles. Edited by N. Hotton, III, P.D. MacLean, J.J. Roth, and E.C. Roth, Washington, Smithsonian Institution, 1986, p.109-131, Refs. p.128-131.

DLC QE862.S8E25

The observed distributions of therapsids suggest their exclusion from hot equatorial and dry regions throughout their existence, but that warm-to-temperate worldwide climatic conditions allowed the therapsids to exist at very high paleolatitudes, such as in Antarctica in the Lower Triassic. The similarities of distribution of taxa worldwide suggest that no marked barriers to migration existed throughout the Permian-Triassic. The observed distributions probably represent the distribution of known tetrapod-bearing terrestrial sediments of various ages as strongly as they represent actual faunal ranges.

E-35895

Taylor, T.N., Taylor, E.L., **Structurally preserved fossil plants from Antarctica. 3. Permian seeds,** *American journal of botany,* June 1987 74(6), p.904-913, 36 refs.

Small, anatomically preserved gymnospermous seeds are detailed from late Permian age silicified specimens collected in the Beardmore Glacier region. The seeds are platyspermic with prominent, sarcotestal wings and a simple pollen chamber. The integument consists

of a narrow endotesta, a two-parted sclerotesta and a complex sarcotesta. In mature seeds, the nucellus is present as a papery layer, separated from the endotesta by a nucellar and endotestal cuticle. Cellular megagametophytes are present in many of the seeds and commonly contain two archegonia. A multicellular embryo is present within each archegonium. The embryos are at a similar stage of development and provide evidence of simple polyembryony in these seeds. Although the affinities of the seeds are not presently known, they are discussed in the context of other seeds described from Gondwana deposits, as well as the known flora from the Beardmore Glacier area. (Auth.)

E-35896

Berkley, J.L., **Four antarctic ureilites: petrology and observations on ureilite petrogenesis,** *Meteoritics,* June 30, 1986 21(2), p.169-189, Refs. p.187-189.

The author presents new data on the petrography and mineral compositions of the antarctic ureilites Yamato-790981, RKPA 80239, ALHA 81101, and PCA 82506. These meteorites, with the exception of ALHA 81101, are not highly shocked. The petrogenesis of ureilites is discussed on the basis of the hypothesis that these meteorites are intrusive igneous rocks crystallized from a C-rich silicate melt. The author discusses the sequential crystallization of the major silicate minerals, and the FeO-MgO distribution between olivine and pigeonite.

E-35898

Dowdeswell, J.A., **Processes of glacimarine sedimentation,** *Progress in physical geography,* Mar. 1987 11(1), p.52-90, Refs. p.82-90.

Processes influencing glacimarine sedimentation are emphasized here, rather than the depositional patterns which result. Of particular importance are, first, the interactions between ice masses and marine waters which lead to primary sedimentation and second, the mechanisms of reworking which may disturb and redistribute sea floor sediments. Continuing improvements and innovations in field equipment allow increasingly detailed investigation of sea floor processes and iceberg calving rates and drift tracks. Within the glacimarine environment there are a number of processes, their rates of operation, and the fluxes of sediment involved, which are still only poorly understood. Among these are, for example, the temperature and current regime at the base of ice shelves, the rates of melting of icebergs, and the content, distribution and flux of debris through tidewater glaciers, ice shelves and icebergs. The temporal relationships between different elements of the ice-ocean system also exert a fundamental influence on glacimarine sedimentary sequences, but our knowledge of these is also limited. Tidal and wind forcing of fjord circulation and ice advance and retreat across polar continental shelves are also considered. (Auth. mod.)

E-35901

Stump, E., ed, **Geological investigations in northern Victoria Land,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, 391p., For individual papers see E-35902 through E-35914, E-35916 through E-35919 and L-35915.

DLC QE350.G44 1986

The papers presented in this volume are an outgrowth of the 1981-1982 International Northern Victoria Land Project. Geologists from Australia, New Zealand, and the United States participated; parties were staged out of a remote, helicopter-supported field camp located on Evans Névé. Overlapping this project in both space and time has been a succession of expeditions in northern Victoria Land from the Federal Republic of Germany (GANOVEX 1980-1984). Parties from the United States (1982-1983) and New Zealand (1983-1983) have also returned to the area. The focus of so many different groups on a single region has produced a dialogue unprecedented in antarctic geology. While some of the papers herein are not without speculation, for the most part they are final reports presenting detailed results of fieldwork and subsequent laboratory analysis. (Auth. mod.)

E-35902

Babcock, R.S., Plummer, C.C., Sheraton, J.W., Adams, C.J., **Geology of the Daniels Range, north Victoria Land, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.1-24, 29 refs.

The Daniels Range represents a section of late Precambrian (?) to early Paleozoic continental crust that has been pervasively intruded by granitic rocks. At least two stages of magmatic activity can be recognized: (1) syntectonic granites, migmatites, and closely related metamorphic rocks informally named the Wilson plutonic complex (WPC) and (2) posttectonic granites assigned to the Granite Harbour Intrusives. The WPC consists dominantly of xenolithic/xenocrystic and layered granitic intrusives which were apparently derived by partial melting of the metasedimentary rocks with which they are associated. The Granite Harbour Intrusives consist of more homogeneous granitic dikes, sills, and plutons, including three larger plutons ranging from 5 to 10 km in diameter. Both the WPC and the Granite Harbour granites are predominantly S-type in contrast to minor I-type hornblende-bearing tonalites and diorites. These mafic intrusives are mainly posttectonic and thus have been grouped with the Granite Harbour Intrusives. However, at least a few syntectonic mafic intrusives are associated with the WPC. (Auth. mod.)

E-35903

Adams, C.J., **Age and ancestry of metamorphic rocks of the Daniels Range, USARP Mountains, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.25-38, 24 refs.

Rubidium-strontium (Rb-Sr) whole-rock isochron and uranium-lead monazite ages are reported for metamorphic rocks, the Rennick Schists, and Wilson Gneisses (informal subdivisions of the Wilson Group) in the northern Daniels Range. Rennick Schists, of both psammitic and pelitic type, yield Rb-Sr whole-rock isochron ages of 534 and 531 Ma, respectively (Cambrian), suggesting that early metamorphism predates Wilson Gneisses. The initial ratios are 0.7187 and 0.7243 respectively. Model ages based on averaged isochron data suggest that in sedimentary age, the Rennick Schists cannot be older than 1150 Ma, i.e., late Precambrian. Wilson Gneisses yield a Rb-Sr age of 490 Ma and U-Pb ages of 484-488 Ma, which indicate a Cambro-Ordovician age for these orthogneisses. They may be regarded as an early phase of the Granite Harbour Intrusives, a major plutonic phase of the Ross (Cambro-Ordovician) Orogeny in northern Victoria Land. (Auth. mod.)

E-35904

Wodzicki, A., Robert, R., Jr., **Geology of the Bowers Supergroup, central Bowers Mountains, northern Victoria Land,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.39-68, Includes area map in jacket. 41 refs.

The Bowers Supergroup is at least 6.5 km thick and consists of Solidarity, Molar, and Glasgow formations of the Middle Cambrian Sledgers Group; Middle Cambrian to Early Ordovician Mariner Group; and Middle Ordovician Leap Year Group. The Supergroup was folded about N30 deg W axes, metamorphosed to prehnite-pumpellyite facies, then tectonically juxtaposed by strike slip faults against Wilson and Robertson Bay terranes. Deposition of the Leap Year Group, folding, metamorphism, and faulting occurred between about

490 and 430 Ma and resulted from a collision between Wilson and Bowers terranes during the Ross Orogeny in northern Victoria Land. Between 420 and 384 MA, refolding about N60 deg E axes and normal faulting occurred during the Borchgrevink Event. The three terranes became stitched by the time postorogenic Admiralty Intrusives were emplaced. (Auth. mod.)

E-35905

Schmierer, K., Burmester, R., **Paleomagnetic results from the Cambro-Ordovician Bowers Supergroup, northern Victoria Land, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.69-90, 61 refs.

Fieldwork conducted during the 1981-1982 field season in the Lanterman, Solidarity, and Explorers ranges of the Bowers Mountains included paleomagnetic sampling of volcanic and sedimentary rocks of the Cambro-Ordovician Sledgers Group (Solidarity Formation, Molar Formation, and Glasgow Volcanics) and Leap Year Group (Carryer Conglomerate). Paleomagnetic analysis including alternating field (AF) and thermal demagnetization found great variation in intensity and stability of remanent magnetization. Approximately one third of the sites have magnetic directions that are significantly different from one another. The magnetization is of normal polarity, is well defined, and postdates synmetamorphic F1 folding (467-441 Ma), but it may predate much younger deformation. Partial thermal viscous remanent magnetization (PTVRM) is suggested as the remagnetization mechanism by the observation that thermally distributed unblocking is found in all samples. (Auth. mod.)

E-35906

Findlay, R.H., **Structural geology of the Robertson Bay and Millen terranes, northern Victoria Land, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.91-114, 64 refs.

The structural geology and history of the Robertson Bay and Millen terranes are described and compared with recent structural and geochronological studies elsewhere in northern Victoria Land. One phase of upright folding occurs throughout the Robertson Bay terrane, producing an axial plane cleavage that intensifies to the southwest. A later deformation produced shortening normal to that cleavage. Three phases of folding occur in the Millen terrane. The synmetamorphic first event produced isoclinal folds and an axial plane schistosity; the second event produced upright, open folds with an axial plane crenulation cleavage. The third is represented by kinks related to younger faults. Upright and isoclinal faults are contemporaneous at 510 m.y. B.P. and may have developed during large-scale westward thrusting. Open folds and the shortening across the Robertson Bay terrane followed the first deformation, in response to west-over-east reverse faulting. (Auth.)

E-35907

Borg, S.G., Stump, E., Holloway, J.R., **Granitoids of northern Victoria Land, Antarctica: a reconnaissance study of field relations, petrography, and geochemistry,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.115-188, Includes map in pocket. Refs. p.185-188.

The pre-Permian metamorphic basement rocks of northern Victoria Land may be divided into three terranes which are separated by north-northwest trending, high-angle faults. The Wilson terrane occupies the western part, the Bowers terrane occupies the central part, and the Robertson Bay terrane occupies the eastern part of northern Victoria Land. Granitic rocks occur throughout the region, and most may be grouped as either lower Paleozoic Granite Harbour Intrusives or middle Paleozoic Admiralty Intrusives. These two groups are distinguished primarily on the basis of isotopic age and are spatially separated as well. The Cambro-Ordovician Granite Harbour Intrusives are confined to the Wilson terrane and comprise a variety of lithologies. (Auth. mod.)

E-35908

Klobcar, C.L., Holloway, J.R., **Petrography and geochemistry of igneous and metamorphic rocks from the Emlen Peaks and Robertson Bay-Everett Range area, northern Victoria Land, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.189-202.

The Emlen Peaks consist of Wilson Group metasediments which were intruded by one of the Cambro-Ordovician Granite Harbour Intrusives. This Granite Harbour Intrusive is a corundum-normative (S-type) two-mica granite. Representative samples from each of the three groups of rocks were analyzed for major elements; rare earth elements (REE); and Th, U, Rb, Sr, Ba, Zr, Y, N2, H2O, and CO2. The Wilson Group host rocks are predominantly metashales and metagraywackes. Comparison of the trace-element chemistry of the Wilson Group with that of the Robertson Bay Group shales and graywackes shows that these groups have few differences and probably cannot be distinguished chemically. Partial melting of a pelitic source region is indicated by the presence of sillimanite as a restite phase. REE problems for the granite indicate that garnet was also a restite phase in the partial melting event. On the basis of their chemistry, either Wilson Shale or Robertson Bay Shale could have been the source for the granites. (Auth.)

E-35909

Adams, C.J., Whitla, P.F., Findlay, R.H., Field, B.F., **Age of the Black Prince volcanics in the central Admiralty Mountains and possibly related hypabyssal rocks in the Millen Range, northern Victoria Land, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.203-210, 25 refs.

Potassium-argon (K-Ar) total-rock ages are reported for two andesites at Mount Black Prince (Admiralty Mountains) and five andesite-rhyodacite dikes, one from the Admiralty Mountains and four from the Millen Range in northern Victoria Land. Five of the ages determined, including those of the Black Prince flows, are in the range 323-382 Ma; the other results are 300 Ma and 307 Ma. The older ages in the range 350-382 Ma are a minimum estimate for the Black Prince volcanics and associated intrusives and confirm the mid-Devonian to early Carboniferous age deduced from plant fossils in intercalated volcaniclastic sediments. The volcanics may be part of the igneous cycle that produced widespread granite plutons in this region during late Devonian to early Carboniferous. (Auth.)

E-35910

Collinson, J.W., Pennington, D.C., Kemp, N.R., **Stratigraphy and petrology of Permian and Triassic fluvial deposits in northern Victoria Land, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.211-242, 40 refs.

The Beacon supergroup in northern Victoria Land is represented by three formations, an unnamed Upper Carboniferous-Lower Permian diamictite, the Takrouna Formation of Permian age, and an Upper Triassic unit, which is herein named the Section Peak Formation. The diamictite unit occurs sporadically in the Lanterman Range, the Morozumi Range, and the Neall Massif area. A maximum thickness

of 350 m has been reported from the Lanterman Range, where the diamictite is demonstrably of glacial origin. No definite glacial features were observed in the diamictite at other localities. The Takrouna Formation, a predominantly sandstone unit with subsidiary noncarbonaceous and carbonaceous mudstone, occurs in the lower Rennick Glacier region in the Freberg Mountains, Lanterman Range, Morozumi Range, and Helliwell Hills. The maximum known thickness is about 300 m. The Section Peak Formation, which is dominated by coarse sandstone, occurs in the upper Rennick Glacier region along the margin of the polar plateau. The Section Peak formation is less than 100 m thick in the study area, although it may be considerably thicker to the south at Timber Peak on the Priestley Glacier. (Auth. mod.)

E-35911

Hammer, W.R., **Takrouna Formation fossils of northern Victoria Land,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.243-247, 12 refs.

New fossil localities in the Takrouna Formation of northern Victoria Land yielded floras of *Glossopteris* and trace fossils. No megafossils assignable to an age younger than Permian occur in any northern Victoria Land Beacon exposures. Included among the Boggs Valley floral specimens is a compression fossil of a glossopterid reproductive structure. Although it is incompletely preserved, this organ appears similar to multiovulate strobilar structures of the strictoid type. (Auth.)

E-35912

Elliot, D.H., Siders, M.A., Haban, M.A., **Jurassic tholeites in the region of the upper Rennick Glacier, north Victoria Land,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.249-265, Includes map in pocket. 26 refs.

Lavas of the Kirkpatrick Basalt form a prominent series of mesas in the upper Rennick Glacier region. The stratigraphic thickness is about 780 m, consisting of up to 40 flows ranging from less than 1 m to as much as 135 m thick. Interbeds in the sequence occur sparsely and include both fossiliferous lacustrine beds and volcanogenic rocks. The lavas cover topography of at least 50 m. Correlative diabase sills of the Ferrar Dolerite, which intrude Beacon strata, occur near the southern end of Gair Mesa, along the plateau escarpment to the west, and to the east of Aeronaut Glacier. The structure at the southern end of Gair Mesa is a broad, shallow syncline; to the north a major fault separates the lavas from the escarpment to the west. Regionally, the lavas also form an isolated outcrop in the lower Rennick Glacier, whereas the diabase sills occur over a wide area. The Rennick graben postdates the Jurassic magmatism. (Auth. mod.)

E-35913

Elliot, D.H., Haban, M.A., Siders, M.A., **Exposure Hill Formation, Mesa Range,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.267-278, 13 refs.

A sequence of pyroclastic rocks crops out below the Jurassic Kirkpatrick Basalt and above the Triassic Section Peak Formation in the Mesa Range region. These rocks include breccia, lapilli tuff, tuff, and tuffaceous sandstone. Compositionally, the coarser clasts are dominated by those of basaltic composition, although megaclasts of sandstone from the Section Peak Formation are locally conspicuous. Finer clasts that form the tuffs and the matrix of breccias and lapilli tuffs include basaltic ash and pyroxene grains as well as a silicic component derived from the Section Peak Formation. Characteristics of the basaltic component suggest that hydroclastic processes operated during formation of these rocks. This sequence of pyroclastic rock represents an early phase of the tholeiitic magmatism of the Ferrar Group. (Auth.)

E-35914

Elliot, D.H., Foland, K.A., **Potassium-Argon age determinations of the Kirkpatrick Basalt, Mesa Range,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.279-288, 18 refs.

New K-Ar analyses of whole-rock samples of lavas of the Kirkpatrick Basalt from the Mesa Range, north Victoria Land, give ages which range from 113 to 178 m.y. An age of 178 m.y. for the uppermost flow gives a minimum age for the lava pile and is consistent with previous estimates of the time of eruption of the lavas throughout the Transantarctic Mountains. The uppermost flow is of the high-Ti type in contrast with lower flows; thus this type of tholeiite in the Mesa Range is not appreciably younger than other Kirkpatrick Basalts. Different ages are obtained not only for rocks of the same flow but also for various size fractions of the same sample. Younger ages appear to be the result of variable Ar-40 loss from poorly retentive phases, most likely in the mesostasis of the lavas. The actual timing and cause of Ar-40 loss is uncertain. (Auth.)

E-35916

Kyle, P.R., **Mineral chemistry of Late Cenozoic McMurdo Volcanic Group rocks from The Pleiades, northern Victoria Land,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.305-337, 62 refs.

Volcanic rocks from Quaternary cones and domes at The Pleiades comprise a mildly potassic, weakly undersaturated evolutionary trend of trachyandesite, tristanite, K-trachyte, and peralkaline K-trachyte. Electron microprobe analyses of the main mineral phases in seven lava samples and a cognate essexite xenolith were used to examine the mineral paragenesis. Olivine is a common constituent. Clinopyroxene occurs in all rock types except the peralkaline K-trachyte and shows a well-defined augite-hedenbergite-aegirine trend. Kaersutite shows no significant chemical variations in five samples examined. Titanobiotite occurs in the essexite and a K-trachyte. Titanomagnetite is common and often shows evidence of deuteric alteration and oxidation exsolution. Other opaque oxides include titanohematite, maghemite, and ilmenite. Feldspars show a continuous range in compositions from bytownite-labradorite in the basic rocks to sanidine in the trachytes. Minor quantities of apatite, baddeleyite, zircon, and pyrrhotite occur. Magnetite-ilmenite, olivine-clinopyroxene, and plagioclase geothermometers show poor agreement; however, each indicates a progressive decrease in temperature with increasing magma evolution. (Auth.)

E-35917

Denton, G.H., Bockheim, J.G., Wilson, S.C., Schlüchter, C., **Late Cenozoic history of Rennick Glacier and Talos Dome, northern Victoria Land, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.339-375.

Rennick Glacier, 380 km long and up to 35 km wide, flows northward from an elevation of 2,200 m in the Mesa Range along Rennick Fault to the Pacific Ocean. It separates the mountains of northern Victoria Land from the peripheral Talos Dome of the East Antarctic ice sheet. Northern Victoria Land mountain glaciers and the Talos Dome both feed Rennick Glacier. The present-day grounding line is at the glacier midsection near Litell Rocks. Two major glacial erosional features characterize the Rennick Glacier area. First, exposed

mountains show classic features of alpine glacial erosion, and the troughs beneath Rennick Glacier and its tributaries might well be glacially deepened. Second, a glacial trimline cut into this alpine topography slopes smoothly from 2,830 m at the glacier head to 1,120 m near Rennick Bay. Bedrock ridges above the trimline are commonly serrated, whereas those below the trimline lack serrations and some show glacial polish and striations. Drift patches and erratics occur below the trimline, and ice-cored moraines fringe modern blue-ice tongues. Soils of weathering stage 1 characterize the ice-cored moraines, whereas those of stages 1 and 2 occur on most drift patches. (Auth. mod.)

E-35918

Faure, G., **Provenance of feldspar in till from the Morozumi Range, northern Victoria Land,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.377-381, 15 refs.

A sample of till, collected several hundred meters above the present surface of the rennick Glacier along the east side of the Morozumi Range, is poorly sorted and contains clasts presumably derived from the Robertson Bay Group and the Granite Harbour Intrusives. Feldspar concentrates from different sand-size fractions have Rb/Sr ratios that decrease with decreasing grain size from 0.926 (2000-1000 microns) to 0.704 (125-63 microns). The feldspar fractions yield a date of 469.0 Ma by the Rb-Sr method that is similar to the previously determined age of Granite Harbour Intrusives in the Morozumi Range. This result is consistent with field evidence and clast lithologies, all of which indicate that the till was deposited by ice derived from the Morozumi Range. There is no indication that feldspar of Precambrian age is present in this till. (Auth.)

E-35919

Zeller, E.J., Dreschoff, A.M., Kropp, W.R., **Evaluation of the uranium resource potential of northern Victoria Land,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.383-391, 13 refs.

Radiometric surveys in northern Victoria Land have shown that portions of the area are sufficiently high in uranium to be considered a uraniferous province. Maps of the uranium and thorium distributions have been prepared and are included in this report. The uraniferous area is located in the southern portion of the region that was surveyed and is characterized by outcrops of the Granite Harbor Intrusives. There is evidence of accumulations of uranium as primary minerals in the Granite Harbor plutons, and there is also a strong indication of secondary concentrations associated with the Kukri Erosion Surface in the Lichen Hills and Caudal Hills. The radiometric signatures of the Admiralty Intrusives were found to differ strongly from those of the Granite Harbor plutons. (Auth.)

E-35921

Meteoritical Society, **Abstracts of papers presented at the 49th annual meeting of the Meteoritical Society, September 22-25, 1986, New York, NY,** *Meteoritics,* 1986 21(4), p.327-549.

Twenty of the abstracts in this collection relate to the Antarctic. They deal with volatile/mobile chalcophile, siderophile and lithophile trace elements (J.E. Dennison, et al); distribution of rare earth elements (M. Ebihara); uranium-series study of ice in Byrd core (E.L. Fireman); the ALHA 82130 ureilite (M.M. Grady et al); natural thermoluminescence of antarctic meteorites (F.A. Hasan et al); cosmic ray produced Be-10 and Al-26 in Frontier Mountain chondrites (U. Herpers et al); compositional study of several chondrites (G.W. Kallemeyn); components of dust bands in ice (U.B. Marvin); mineralogy of pigeonites (H. Mori et al); noble gases in ALH 82130 (U. Ott et al); volatile trace elements (R.L. Paul et al); temperatures in antarctic meteorites (L. Schultz); mineral separates from three aubrites (C. Schwarz et al); alpha track imaging of chondrites for B/Li distributions (D.M. Shaw et al); light rare earth element host phases in ureilites (A.H. Spitz et al); Yamato polymict eucrite with affinities to howardites (H. Takeda et al); Spherules from polar ice and atmosphere (K. Thiel et al); Shergottite EETA79001 (S.J. Wentworth); Yamato-791839 ureilite with melt-portion (K. Yanai et al); and aqueous alteration inferred from weathering (M.E. Zolensky et al).

E-35929

Barrett, P.J., Elston, D.P., Harwood, D.M., McKelvey, B.C., Webb, P.N., **Mid-Cenozoic record of glaciation and sea-level change on the margin of the Victoria Land basin, Antarctica,** *Geology,* July 1987 15(7), p.634-637, 25 refs.

The MSSTS-1 drill hole in western McMurdo Sound provides the earliest physical record thus far for Antarctic Cenozoic glaciation. The hole penetrated 227 m of muddy marine glacial sediment containing scattered pebble- and cobble-size clasts, including seven diamictite beds deposited from grounded ice during glacial advances. A diatom-based chronology, refined by paleomagnetic stratigraphy, for the interval below 116-m subbottom indicates sediment accumulation from 29 Ma to about 24 Ma. Sediment texture and paleoecology of diatoms and foraminifers indicate nearshore sedimentation on a wave-dominated shelf. The oldest strata record a significant shallowing of water depth, culminating in ice grounding at around 28 Ma and a deepening at 25 Ma that may be glacioeustatic. (Auth.)

E-35985

Bradshaw, J.D., Weaver, S.D., Laird, M.G., **Suspect terranes and Cambrian tectonics in northern Victoria Land, Antarctica,** Tectonostratigraphic terranes of the circum-Pacific region, edited by D.G. Howell, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, 1985, p.467-479, 49 refs.

DLC QE350.4.T43 1985

The early Paleozoic rocks of northern Victoria Land comprise at least three and possibly five suspect terranes. The key unit is the Bowers terrane, a narrow fault-bounded strip of folded Cambrian sediments and volcanics that can be traced from the southern ocean to the Ross Sea. To the west, amphibolitic paragneiss in the Lanterman Range and lower grade quartzose flysch in the Daniels and Morozumi Ranges are host to Cambro-Ordovician migmatites and granitoid plutons. The paragneiss and flysch-type successions do not occur together and are tentatively regarded as two suspect terranes. East of the Bowers terrane lie two further suspect terranes, an extensive nonschistose quartz-rich flysch sequence (Robertson Bay Group) and a narrow fault-bounded strip of schistose rocks that separates the Robertson Bay rocks from the Bowers terrane. The narrow strip has structural and metamorphic features not seen in either of the adjacent terranes. A model is proposed, involving strike-slip modification of an arc that varied from intraoceanic to intracontinental along its length. A speculative reconstruction of the Cambrian continental margin that incorporates the model is presented. (Auth. mod.)

E-35986

Dalziel, I.W.D., Grunow, A.M., **Pacific margin of Antarctica: terranes within terranes within terranes,** Tectonostratigraphic terranes of the circum-Pacific region, edited by D.G. Howell, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, 1985, p.555-564, 38 refs.

DLC QE350.4.T43 1985

The terrane concept is applicable to the Pacific margin of Antarctica in three respects. First, West (or Lesser) Antarctica presently appears to consist of at least four discrete or semidiscrete microcontinents that have moved relative to each other and relative to the East

(Greater) Antarctic craton during and/or since Gondwanaland breakup. These are the Antarctic Peninsula, Ellsworth Mountains-Whitmore Mountains, Thurston Island-Eights Coast, and Marie Byrd Land. All seem to have been originally part of the Pacific margin of the supercontinent. Second, rocks along the Pacific margin of the Antarctic Peninsula form a subduction complex accreted to the continent during the late Paleozoic(?), Mesozoic, and possibly the Cenozoic. The manner of accretion, gradual offscraping and/or as exotic blocks, is unclear. Third, Cenozoic spreading has resulted in the separation of the South Shetland Is. (partially) and South Orkney Is. (completely) from the Antarctic Peninsula. The former is therefore parautochthonous and could in the future be reunited with the continent; the latter has already become an exotic terrane. Thus, like other parts of the Pacific margin, the subduction complexes of the South Shetland and South Orkney islands are, according to the tenets set out in this volume, terranes within terranes within terranes. (Auth. mod.)

E-35987

Yanai, K., ed, **Proceedings of the Eleventh Symposium on Antarctic Meteorites, 1986,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, 282p., For individual papers see E-35988 through E-36007.

The eleventh symposium became more international than previous symposia and two special sessions were convened in an attempt to report the results of the international consortium studies on the three Yamato lunar meteorites and Yamato-691 enstatite chondrite. Three special lectures were given at the symposium by foreign scientists. Of the 69 scientific papers presented at the symposium including 18 by overseas scientists from 5 countries, 22 scientific papers are compiled in this volume. These papers cover various subjects such as petrology, mineralogy, chemical studies, isotope studies, physical and magnetic studies on antarctic meteorites. This volume consists of two parts. Results of the newly identified lunar meteorites Yamato-82192 and -82193, and Yamato-791197 are contained in Part A. Yamato-82192 and -82193 might be a pair, but they are fairly different from Yamato-791197 and another lunar meteorite Allan Hills A81005 collected by the U.S. team. Part A also includes some papers on the Yamato-691 enstatite chondrite after international consortium study. The papers of Part B present new results of petrological and mineralogical studies, trace elements and isotope chemistry, physical and magnetic properties on antarctic and non-antarctic meteorites including some unique types. Some papers report Yamato-82041 as an unusual carbonaceous chondrite with CM affinities, possibly CM1. (Auth.)

E-35988

Warren, P.H., Kallemeyn, G.W., **Geochemistry of lunar meteorite Yamato-82192; comparison with Yamato-791197, ALHA81005, and other lunar samples,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.3-20, Refs. p.18-20.

INAA compositional data is reported for a 171 mg bulk-rock sample of lunar meteorite Yamato-82192, and for two small clasts extracted from the matrix. The two clasts were also studied petrographically, but both appear to be polymict impact melt breccias, not greatly different in composition from the bulk rock. Y-82192 is a regolith breccia from a highlands region with remarkably low contents of incompatible elements, by the standards of the small region of the central near side that was explored by the Apollo and Luna sample-return missions. Based on disparities in *mg* between Y-82192 and ALHA81005, and in Eu/Al and Na/Al between Y-82192 and -791197, it is argued that these meteorites probably formed at three different locations, many km apart. Considering the low probability that a crater exists which is both sufficiently large and sufficiently young to account for all three meteorites, it is concluded that more than one, and probably more than two, impacts were responsible for launching these samples off the moon. (Auth. mod.)

E-35989

Bischoff, A., **Petrography, shock history, chemical composition and noble gas content of the lunar meteorites Yamato-82192 and -82193,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.21-42, 41 refs.

The antarctic meteorites Yamato-82192 and -82193 are lunar polymict shock-lithified fragmental breccias with a minor regolith component. They are probably paired. The breccias are composed of a great variety of lithic and mineral fragments embedded in a fine-grained, densely compacted clastic matrix. Recrystallized feldspathic rocks and breccias, and granulitic lithologies are by far the dominant rock types. Crystalline impact melt breccias are common, however the amount of devitrified glasses is negligible. Glasses, common in ALHA81005, are missing Y-82192 and -82193. Both samples contain some large basaltic clasts. All mineral and lithic clasts are shocked, and most plagioclases are recrystallized. No indication was found that the meteorite as a whole has been shocked to more than 20 GPa. The chemical composition of Y-82192 is very similar to that of the other lunar meteorites. Major differences are the low absolute abundances of REE and their flat chondrite normalized patterns. The noble gas content of Y-82192 is entirely different from that of Y-791197 and ALHA81005. The light noble gases He, Ne, and Ar are dominated by spallogenic and radiogenic components while the trapped gases are similar to those in the Apollo 17 boulder and to those of "normal" meteorites. There is no indication that Y-82192 contains, or ever contained, any solar-wind implanted noble gases. (Auth. mod.)

E-35990

Takeda, H., Mori, H., Tagai, T., **Mineralogy of lunar meteorites Yamato-82192 and -82193 with reference to breccias in a breccia,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.43-55, 18 refs.

The mineralogy of pyroxene, olivine and plagioclase fragments, lithic clasts and glassy matrices of lunar meteorites, Yamato-82192 (Y-82192) and Yamato-82193 (Y-82193), has been studied by an electron microprobe and an analytical transmission electron microscope (TEM). The distribution of the chemical compositions of pyroxene grains in Y-82192 and -82193 bears a strong resemblance to one another and covers almost all known pyroxenes in nonmare pristine rocks. The grains are similar to those of a lunar regolith breccia 60019, but appear to be different from Y-791197 and ALHA81005 in that Y-82 lunar meteorites have significantly fewer pyroxenes with extremely high Fe content. The difference implies that Y-82192 and -82193 may contain fewer Fe-rich mare basalt components. The presence of a breccia in a breccia in Y-82192 indicates complex impact histories in the region where this meteorite was derived. The texture of the matrix glass of Y-82192 in the TEM scale is different from that of ALHA81005. (Auth.)

E-35991

Goodrich, C.A., Keil, K., **Mare basalt and other clasts in Yamato lunar meteorites Y-791197, -82192 and -82193,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.56-70, 35 refs.

A study of lithic clasts >0.1 mm in size in new thin-sections of the lunar meteorites Y-791197, -82192 and -82193 revealed that Y-791197 and -82192 may contain components of low-Ti mare basalt, which has not previously been identified in any of the four known lunar meteorites. Of eleven clasts from Y-791197, one is a very low-Ti (VLT) mare basalt, four are ferroan mafic lithologies that are either low-Ti mare basalts or polymict breccias with a large component of low-Ti mare basalt, three are ferroan anorthositic rocks, and three are magnesian granulitic breccias. In Y-82192 and -82193 magnesian clasts, most of which are polymict, are relatively more abundant. Of

nine clasts from Y-82192, one is a possible low-Ti mare basalt, two are ferroan mafic lithologies that are either low-Ti mare basalts or polymict breccias with a large component of low-Ti mare basalt, and six are more magnesian polymict breccias. Of four clasts from Y-82193, three are magnesian polymict breccias and one may be a fragment of a pristine Mg-suite lithology. The presence of a significant mare basalt component in at least three of the four lunar meteorites is consistent with orbital geochemical data that suggest that the farside highlands have a 30% component of mare basalts that may predate the final heavy lunar bombardment. The lunar meteorites need not be derived from a source region near visible maria. Available data are insufficient to say whether all four lunar meteorites were derived from a single impact. (Auth.)

E-35992

Takahashi, K., Masuda, A., **Two lunar meteorites, Yamato-791197 and -82192: REE abundances and geochronological dating,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.71-88, 16 refs.

Four antarctic meteorites (ALHA81005, Y-791197, -82192 and -82193) have been identified as lunar meteorites. REE, Rb, Sr and Ba abundances and major element compositions in specimens separated from Y-791197 and -82192 were investigated. The genesis of these lunar meteorites using Rb-Sr systematics and Nd isotope ratios is discussed. Most REE patterns show similar features, reflecting those of anorthosites, and also show positive Ce anomalies. These Ce anomalies are considered to have been formed 3.9-4.0 b.y. ago, based on the age obtained from the Rb-Sr systematics for Y-791197 and -82192,55A. It is possible that these Ce anomalies could have been formed by an oxic alteration and this event might be related to the observation that the initial SR-87/Sr-86 ratios are significantly low. Y-82192,63B shows a glassy feature and an age of 0.71 b.y. has been obtained from the Rb-Sr systematics for this sample. This age could indicate an event of impact partial melting. The Sm-Nd systematics of Y-82192,55A suggests that the REE abundances of this meteorite were differentiated from the chondritic abundances at the age 3.9 b.y. obtained from the Rb-Sr systematics. Based on the Sm-Nd data, the original formation of the parent materials of this meteorite could be traced back to around 4.3 b.y. ago. (Auth.)

E-35993

Dennison, J.E., Kaczaral, P.W., Lipschutz, M.E., **Volatile chalcophile, siderophile and lithophile trace elements in lunar meteorite Yamato-82192,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.89-95, 17 refs.

Neutron activation analyses of Ag, Au, Bi, Cd, Co, Cs, Ga, In, Rb, Sb, Se, Te, Ti, U and Zn in whole-rock, melted and unmelted regolith samples of Yamato-82192 reveals a lunar highlands origin plus meteorite admixture, 2,4% Cl-equivalent for micrometeorites and ancient impact component. A small but real amount of mobile element loss occurred during the shock-melting episode that formed Y-82192. Differences in trace element and other trends indicate pronounced differences in the thermal histories of the parent regoliths of Allan Hills A81005 and Y-791197 and -82192 so that each must have been produced by a separate impact on the Moon. (Auth.)

E-35994

Takaoka, N., **Noble gas study of Yamato-82192 lunar meteorite,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.96-104, 27 refs.

Concentrations and isotopic ratios of noble gases in matrix and glassy clast of the lunar meteorite Yamato-82192 are reported. Trapped gases are greatly depleted compared with other lunar meteorites (Y-791197 and Allan Hills A81005). However, the meteorite retains radiogenic Ar-40 quantitatively. The K-Ar age is 3.9 Ga, in good agreement with the Ar-39/Ar-40 age of Y-791197 and lunar highland rocks. From the three-isotope plot of Ne and the abundance pattern of the trapped gas, the trapped gas is solar-type. The cosmogenic Ne-22/Ne-21 and Xe-131/Xe-126 ratios suggest low shielding. A model to explain the noble gas data is that the meteorite is composed of a mixture of regoliths from different shielding depths. The regolith mixture was compacted to breccia by a meteorite impact and resided at the low shielding depth of less than 40 g/sq cm for 20 to 40 m.y. The present specimen was produced from the interior of this regolith breccia by another meteorite impact and was thrown out to space. After the flight in space probably for less than 2 m.y., it fell in Antarctica. (Auth.)

E-35995

Kaneoka, I., Takaoka, N., **Ar-40/Ar-39 analyses of lunar anorthositic breccia, Yamato-82192, from Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.105-112, 14 refs.

Lunar anorthositic breccia, Yamato-82192 (Y-82192), collected at the Minami-Yamato Nunataks, was analyzed by the Ar-40/Ar-39 method in order to reveal its chronology. Sample Y-82192,63D shows rather peculiar degassing patterns in that most Ar was degassed only in the highest temperature fraction (1600 C). Such patterns of Ar are observed in strongly shocked lunar samples, as observed in the glassy matrix of Y-791197 and some other lunar samples. Hence, the possibility of inherited Ar cannot be excluded. Thus, the apparent Ar-40/Ar-39 age of 4237 Ma observed in the 1600 C fraction indicates the upper limit for the degassing event in the lunar highland area. On the basis of the amounts of trapped and cosmogenic Ar observed in the present sample, it is inferred that Y-82192 was not exposed on the lunar surface directly but was shielded from both heavy dose of solar wind and galactic cosmic-ray irradiations after the degassing event such as a shock impact. (Auth.)

E-35996

Kitamura, M., Watanabe, S., Isobe, H., Morimoto, N., **Diopside in chondrules of Yamato-691 (EH3),** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.113-122, 9 refs.

Diopside in the chondrules in Y-691 (EH3), most of which include enstatite as phenocrysts, occurs in three different modes; (1) diopside rimming some of the enstatite crystals, (2) single crystals as phenocrysts of the chondrules, and (3) single crystals of diopside enriched in aluminum in one chondrule. The finding of the single crystals of diopside, since that in Qingzhen, indicates their common existence in the E3 chondrites. Common appearance of the single crystals, in contrast with the equilibrated E and the unequilibrated ordinary chondrites, is considered to be related with the reducing condition during the chondrule formation. Crystallization temperature of the crystals is roughly estimated to be 1300-1200 C. Coexistence of aluminum-rich and aluminum-poor diopside in a chondrule implies high pressure episode by shock process. (Auth.)

E-35997

Miyamoto, M., **Diffuse reflectance from 0.25 micron to 25 micron of the Yamato-691 enstatite chondrite,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.123-130, 21 refs.

The reflectance of Y-691 does not show any strong absorption bands except for the UV fall-off shorter than about 0.55 micron in the UV-visible-near infrared wavelength region. The reflectance of Y-691 in the middle infrared wavelength region shows strong absorption bands at wavelengths longer than about 9 micron mainly caused by vibrations of the Si4 cation in enstatite. The reflectance of the iron meteorite (Toluca, octahedrite) does not show any strong absorption bands up to 25 micron except for the UV fall-off shorter than about 0.4 micron. The reflectance of the plate (polished) sample of Y-691 does not show the steep UV fall-off although that of the powder

sample of Y-691 shows a relatively steep UV fall-off at wavelengths less than about 0.55 micron. The plate sample of Y-691 shows a weaker UV fall-off compared with that of the iron meteorite. (Auth. mod.)

E-35998

Takigami, Y., Kaneoka, I., **Investigation of the effect of shock on the antarctic meteorites by the Ar-40/Ar-39 method,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.133-143, 13 refs.

In order to investigate the shock effect on the Ar-40/Ar-39 ages of meteorites, Ar-40/Ar-39 geochronological studies were performed on two antarctic meteorites, Y-790964 (LL, shocked) and Y-790448 (LL3, unshocked). Samples were taken from the inner and the outer parts of each meteorite for comparison. The inner part and two outer parts of the seriously shocked Y-790964 have almost the same plateau ages of 1276 Ma, 1264 Ma and 1241 Ma. Older ages are not observed in the higher temperature fractions, which would indicate a very intense shock event. In the unshocked meteorite, Yamato-790448, the plateau-like ages of about 4492 Ma for the inner part and 4325 Ma for the outer part are observed at lower temperatures, but the reason for the apparent difference of the ages is not yet clear. (Auth.)

E-35999

Mayeda, T.K., Clayton, R.N., Yanai, K., **Oxygen isotopic compositions of several antarctic meteorites,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.144-150, 18 refs.

Oxygen isotopic compositions are reported for seven carbonaceous chondrites, seven ordinary chondrites, two enstatite chondrites, three lunar meteorites, and twelve achondrites. Three of the achondrites (ALH-77081, Y-74063, and Y-74025) do not belong to known groups; the first two of these are related to Acapulco. Two L-group equilibrated ordinary chondrites (Y-75097 and Y-793241) contain xenoliths with isotopic compositions similar to H chondrites. Among the carbonaceous chondrites, the distinction between C1 and C2 chondrites is ambiguous. (Auth.)

E-36000

Kallemeyn, G.W., **Compositional comparisons of metamorphosed carbonaceous chondrites,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.151-161, 24 refs.

Five carbonaceous chondrites (Allan Hills 82135, Coolidge, Karoonda, Pecora Escarpment 82500 and Yamato-693) thought to be metamorphosed chondrites of petrologic types 4 or 5 were analyzed by instrumental and radiochemical neutron activation analysis for 28 elements: Na, Mg, Al, K, Ca, Sc, V, Cr, Mn, Fe, Co, Ni, Zn, Ga, As, Se, Br, Ru, Cd, Sb, La, Sm, Eu, Yb, Lu, Os, Ir and Au. Coolidge and Y-693 are members of the CV clan based on refractory lithophile abundances. Coolidge has significantly depleted volatile element abundances relative to CV3 chondrites and is tentatively classified as CV4. Y-693 is compositionally indistinguishable from the oxidized subgroup CV3 chondrites, showing no significant depletion of volatile element abundances, in conflict with the petrographic data indicating type 5; the chondrite may be heterogeneous. Compositional and petrographic data for Karoonda and ALH82135 suggest they form a grouplet, part of a clan with refractory lithophile abundances intermediate between those of the CM-CO and CV clans. Compositional classification of the severely weathered PCA82500 is difficult because of the scatter of data. It is probably closely related to Karoonda and ALH82135. (Auth.)

E-36001

Grady, M.M., **Yamato-82042: an unusual carbonaceous chondrite with CM affinities,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.162-178, 39 refs.

The Yamato-82042 carbonaceous chondrite has been the subject of a consortium study, designed to determine its properties and hence attempt a more precise classification of the meteorite. Major and minor elemental abundance and oxygen isotope data indicate that the specimen is a CM chondrite, but on textural and petrologic grounds the meteorite is more akin to CI stones. It is possible that Y-82042 is the first CM1 chondrite recognized. (Auth.)

E-36002

McGarvie, D.W., **Stable carbon isotopic study of types 1 and 2 carbonaceous chondrites,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.179-195, 12 refs.

Fourteen C1 and C2 carbonaceous chondrites were studied by a technique of stepped combustion in order to distinguish differences in the abundance, distribution and isotopic composition of refractory carbon fractions. Specifically, the distribution and abundance of C-13 rich carbonaceous matter was qualitatively investigated to provide data on diagnostic patterns and intergroup relations, and to identify possible differences between Antarctic and non-Antarctic C1 and C2 meteorites. The data reveal that the C1 and C2 groups possess different carbon isotope profiles, which could be useful as an aid to classification. Furthermore, the carbon isotope profiles for Antarctic and non-Antarctic C2 meteorites are dissimilar, suggesting fundamental differences in the sources sampled by the two groups, or alternatively, that an antarctic weathering process has affected C2 meteorites residing within and on the ice sheets. (Auth.)

E-36003

Murae, T., Masuda, A., Takahashi, T., **Pyrolytic studies of carbonaceous matter in antarctic carbonaceous chondrites,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.196-204, 24 refs.

Pyrolysis products of the major carbonaceous matter in 6 antarctic carbonaceous chondrites, Y-74662 (C2), Y-791198 (C2), Y-793321 (C2), B-7904 (C2), Y-791717 (C3), and ALH-77307 (C3), have been examined by GC-FID and GC-MS. There is apparently a similarity in the structure of all samples. Many sulfur-containing compounds have been detected as major products in pyrolysis of the residues which were obtained by partial mineral dissolution of Y-791717 and ALH-77307 with concentrated hydrochloric acid. (Auth.)

E-36004

Mukherjee, A., Viswanath, T.A., **Thermometry of diogenites,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar.. 1987 Special issue No.46, p.205-215, 31 refs.

Mg-Fe2 cation exchange reaction between orthopyroxene and spinel has been calibrated thermodynamically and empirically and applied to the thermometry of diogenites. The empirical calibration is more successful, gives internally consistent results and agrees well with independent temperature estimates of a wide range of terrestrial test samples. Uncertainty of the empirically determined temperatures, however, increases with decreasing Mg-Fe2 cation distribution coefficient between orthopyroxene and spinel and increasing Cr-content of the spinel. Applied to a number of diogenites, the empirical calibration gives moderately high temperatures (687 and 885 C) for the Johnstown and Yamato-75032 diogenites and very high temperatures (between 1512 and 1941 C) for Y-692, -74013 and -74136 diogenites. The Johnston and Y-75032 diogenites possibly represent thermally equilibrated orthopyroxene-spinel assemblages comparable

to slowly cooled terrestrial ultramafic plutonic bodies broadly in the 700-900 C temperature regime. The higher temperature Yamato group appears to be disequilibrium assemblages, affected by shock-reheating, partial melting and recrystallization. (Auth.)

E-36005

Saito, J., Tagai, T., Tachikawa, O., Takeda, H., **Mineralogical study of the ALH-77283 iron meteorite,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.226-238, 9 refs.

Of the many meteorites recovered so far from the Yamato Mountains and Victoria Land, Antarctica, only 24 have been irons. One of these, Allan Hills-77283, type IA coarse octahedrite, contains diamond-lonsdaleite nodules, for which extraterrestrial shock origin has been proposed. The shock textures of ALH-77283,52 have been studied by metallographic, X-ray and electron diffraction, and analytical SEM techniques. The shock pressure and temperature were estimated to be about 600-750 kb and 400-500 C from the shock-hatched and recrystallized kamacites in comparison with the standard scale produced by the shock-loaded experiments on the Odessa iron meteorite. (Auth.)

E-36006

Nagata, T., Funaki, M., **Tetrataenite phase in antarctic meteorites,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.245-262, 12 refs.

Four Ni-rich iron meteorites containing tetrataenite (tetrataenite-phase of Fe-Ni metal) and 2 LL chondrites containing the tetrataenite-phase are provisionally selected as the standard tetrataenite-rich meteorites. They are Santa Catharina and Twin City Ni-rich ataxites, taenite lamellae from Toluca and Itutinga octahedrites and St. Séverin and Appley Bridge LL chondrites. The contents of tetrataenite-phase in these standard tetrataenite-rich meteorites were determined by Mössbauer spectral analysis and their magnetic hysteresis and thermomagnetic characteristics were examined. The magnetic criteria for tetrataenite-rich meteorites derived from the present study are summarized. In the present experimental study, 5 antarctic L chondrites and 4 antarctic LL chondrites are magnetically examined. The antarctic chondrites which satisfy the 5 criteria for tetrataenite-rich meteorites are Yamato-74354 (L6), -74362 (L6), -74442 (L6), ALH-76009 (L6) and Y-790964 (LL). (Auth. mod.)

E-36007

Nagata, T., Danon, J.A., Funaki, M., **Magnetic properties of Ni-rich iron meteorites,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 Special issue No.46, p.263-282, 9 refs.

Six Ni-rich ataxites, including Yamato-791694 are magnetically analyzed. They are classified into 3 groups on the basis of the major Fe-Ni phases, Y-791694 being assigned to the ordinary taenite phase. The magnetic hysteresis parameters Is, Ir, Hc and Hrc, before and after heat treatment are tabulated for Y-791694 and their first- and second-run TM curves presented. Hc and Ir/Is in the original preheating stage are as small as those of a uniform 35% Ni Fe-Ni alloy, and both Hc and Ir decrease only slightly, but Hrc decreases considerably during heat treatment, the latter phenomenon being attributed to the disappearance of the effect of high magnetic coercivity caused by the shape anisotropy of kamacite specks upon the bulk value of Hrc.

E-36018

Chang, S.-K., **Terra australis incognita; Antarctica: its natural environment, petroleum, and mineral resources,** *Korean Earth Science Society. Journal,* 1986 7(2), p.117-128, In Korean with English summary. Refs. p.126-128.

Natural environment, petroleum, and mineral resources of Antarctica are briefly reviewed. No petroleum or mineral deposits with economic value have been discovered yet in Antarctica. However, it is thought that petroleum (and probably minerals of Dufek stratiform gabbros) would be most promising in several decades. International stewardship of Antarctica associated with systematic investigations strengthened by modern techniques and facilities will show further possibility in other minerals. (Auth.)

E-36020

Harwood, D.M., **Diatom biostratigraphy and paleoecology with a Cenozoic history of antarctic ice sheet,** Columbus, Ohio State University, 1986, 592p., University Microfilms order No. 86-25224, Ph.D. thesis. Refs. p.559-592.

Antarctic ice-minima conditions are indicated by marine diatoms and other microfossils recovered from Sirius Formation localities spread over 1300 km in the Transantarctic Mountains. Geologic time intervals not represented by microfossils in the Sirius Formation may indicate times of extensive ice development. The glacial history these microfossils suggest is substantiated by comparison to global sea-level and benthic foraminiferal oxygen isotope data. A detailed analysis of isotopic and eustatic records, together with Sirius Formation data, indicate ice-minima conditions and relative warmth, with marine seaways across Antarctica, during the Pliocene, middle Miocene, Late Oligocene/Early Miocene and Early Oligocene and remaining Paleogene. Glaciations are indicated during the Late Oligocene, Late Miocene and Pleistocene. Bottom-water/ice-shelf events, recognized in a detailed comparison of eustatic and benthic oxygen isotopic data, precede Late Oligocene and Late Miocene ice-sheet growth by 5 million years. Analysis of diatom biostratigraphy and paleoecology from numerous *in situ* Oligocene through Pliocene sedimentary outcrops and drill-holes around the antarctic periphery have aided dating of the above reworked microfossils and have documented glacial and marine fluctuations in more uniform environments. (Auth. mod.)

E-36027

Shiraishi, K., Yoshida, M., **Explanatory text and geological map of Botnneset, Antarctica,** *Tokyo. National Institute of Polar Research. Antarctic geological map series,* Mar. 1987 Sheet 25, 9p. + 8 plates + map, 4 refs.

The geology and petrography of the Botnneset Peninsula are shown on a 1:50,000 map, with four 1:25,000 inserts representing the ice-free areas studied—Kumihimo, Innhovde, Vesthovde, and Austhovde rocks—with detailed explanatory notes. Chemical analyses of the rocks are tabulated; the geological structure is briefly described.

E-36028

Nishida, T., Yanai, K., Kojima, H., **Explanatory text and geological map of Honnör Oku-iwa Rock, Antarctica,** *Tokyo. National Institute of Polar Research. Antarctic geological map series,* Mar. 1987 Sheet 23, 6p. + 5 plates + map, 3 refs.

The geology and petrography of Honnör Oku-iwa Rock are shown on a 1:25,000 map, compiled from aerial photographs taken by JARE-6 in 1962, with detailed explanatory notes. Mineral assemblages of the rocks for microprobe analyses are summarized, and the chemical analyses are tabulated; the geological structure is briefly described.

E-36039

Gaździcki, A., Wrona, R., **Polish paleontological investigations in West Antarctica, 1986** [Polskie badania paleontologiczne w Antarktyce Zachodniej (1986)], *Przeglad geologiczny,* Nov. 1986 11(403), p.609-617, In Polish with English and Russian summaries. 36 refs.

Paleontological studies are reported, carried out on King George I. in the summer of 1985-1986, dealing with fossiliferous glacio-ma-

rine sediments on the Melville Peninsula and Low Head region. The sediments of Cape Melville Formation contain abundant marine fossils, some of them in live positions. Microfossils comprise frequent benthic and planktonic foraminifers, diatoms, sponge spicules "hexactin", radiolarians, ostracods, polychaete jaws, as well as the microfossil *Bolboforma*. This Tertiary fossil is autochtonous. The recycled forms include Cretaceous coccoliths and belemnites. The K-Ar data (around 20 Ma) obtained from the andesite dykes cutting through the sediments allow to estimate the age of the formation as no younger than the Early Miocene. The sequence of glacio-marine sediments of the Polonez Glaciation represented by the Polonez Cove Formation is best exposed in the steep cliff-face near Low Head. The sediments of the Polonez Cove Formation are also rich in invertebrate fossils. The *Chlamys* coquinas are the most fossiliferous and contain mixed biota of shallow- to deep-marine environments. The formation was dated as Pliocene by the occurrence of the bivalve *Chlamys anderssoni* analogous to that of the *Pecten* Conglomerate on the Cockburn I. Recently recognized coccoliths indicate Oligocene age of the formation. The K-Ar dating of lavas overlying the studied sequence shows that rocks of the Polonez Cove Formation are older than 23 Ma. A number of samples for further micropaleontological study have been collected. (Auth. mod.)

E-36040

Tokarski, A.K., **Polish geological investigations on King George Island in summer 1985-1986** [Polskie badania geologiczne na Wyspie Krola Jerzego (Antarktyka Zachodnia) w sezonie 1985-1986], *Przeglad geologiczny,* Nov. 1986 11(403), p.617-621, In Polish with English and Russian summaries. 18 refs.

Field work, carried out on Barton Peninsula and at Low Head, King George I., is reported. At Barton Peninsula a calc-alkaline, volcanic-arc, stratified sequence, pierced by 3 intrusions, is divided by subhorizontal décollements into 3 tectonic units. The middle unit, which consists mostly of detrital rocks, is tightly folded, in contrast to the upper unit, which contains thick lava flows and is deformed only by open folds. Both units are folded around a NW-SE-oriented axis parallel to the extension of the Noel Hill intrusion. A recently found fossil flora, considered to be Eocene-Oligocene in age, occurs near the base of the upper unit. The flora is older than the 60 Ma K-Ar date obtained from the Noel Hill intrusion, which post-date the plant-bearing strata. Pillow lavas are found in breccias underlying glacio-marine deposits of the Polonez Cove Formation between Low Head and Chopin Dyke. These breccias, here interpreted as hyaloclastites, were formed contemporaneously with deposition of the lower part of the Polonez Cove Formation. Numerous neptunian dykes occur in deposits of the Low Head Member as well as in the uppermost part of the breccias which underlie them. The dykes in the breccias fill an irregular net of thermal cracks, while in the deposits of the Low Head Member they occur in 2 sets of tectonic tension gashes. One of the sets is older than the Oberek Cliff Member, while the age of the second is not known. (Auth.)

E-36041

Tatur, A., Valle, R.A. del, **Paleolimnological and geomorphological investigations on King George Island, 1984-1986** [Badania paleolimnologiczne i geomorfologiczne na Wyspie Krola Jerzego, Antarktyka Zachodnia (1984-1986)], *Przeglad geologiczny,* Nov. 1986 11(403), p.621-626, In Polish with English and Russian summaries. 9 refs.

The cores of bottom sediments from 5 lakes were taken during the austral winter 1985. Four lakes were located on King George I., and one on the tip of Antarctic Peninsula. Investigated lakes belong to different types and represent different genesis and trophy. Hotel Lake, on Fildes Peninsula, lies high on the flat platform far away from the glacier, in a system of intersecting meltwater channels. Near-shore Kitezh and Dlinnoe Lakes on Fildes Peninsula, which had developed from the sea bays following the sea and beach separation, are now elevated to 16 m above sea level. The proglacial and oligotrophic Rudy Lake on Potter Peninsula developed during several stages of deglaciation. Rudy Lake was formed during deglaciation in a neoglacial event, like the peat bank in the central part of Rescures Hills. The proglacial Boeckella Lake on Antarctic Peninsula developed in geomorphological conditions similar to those of Rudy Lake but under influence of solutions rich in nutrients coming from the large penguin rookery situated on the shore of the lake. The eutrophication of the lake caused abundance of amorphic organic matter occurring in clearly laminated sediments. Penguin colonization near Arctowski Station is traced to the Early Holocene. Buried ornithogenic soils were also found on Stranger Point, Low Head and Blue Dyke, on King George I. (Auth. mod.)

E-36042

Harley, S.L., **Pyroxene-bearing meta-ironstone and other pyroxene-granulites from Tonagh Island, Enderby Land, Antarctica: further evidence for very high temperature (>980 deg C) Archean regional metamorphism in the Napier Complex,** *Journal of metamorphic geology,* July 1987 5(3), p.341-356, 26 refs.

This suite of granulites preserves exsolution-recrystallization features consistent with a shared metamorphic evolution that involves marked cooling from initial metamorphic temperatures of nearly 1000 C. Reintegrated pre-exsolution and pre-reaction grain compositions in the meta-ironstone indicate the former coexistence of metamorphic pigeonite and ferroaugite at temperatures in excess of 980 C for pressures of 7 kbar (0.7 GPa) using pyroxene quadrilateral thermometry. Intra-grain lamellae relationships indicate the exsolution of a second pigeonite from the ferroaugite at temperatures in the range 930-970 C, prior to the *c.* 720-600 C exsolution of orthopyroxene and clinopyroxene (100) lamellae and later partial recrystallization at similar temperatures. Although pyroxenitic and lherzolitic granulites preserve a much less complete history, reintegrated porphyroclast compositions in these yield temperature estimates which approach those inferred from the meta-ironstone. Pyroxene thermometry based on neoblast compositions suggests that recrystallization post-dating a late, low intensity, deformation phase (D3) occurred at temperatures greater than 600 C. (Auth. mod.)

E-36046

Legrand, M., Delmas, R.J., **220-year continuous record of volcanic H2SO4 in the antarctic ice sheet,** *Nature,* June 25, 1987 327(6124), p.671-676, 35 refs.

Continuous H2SO4 profiles observed in snow from several antarctic locations reveal 4 major volcanic events of the past two centuries (Agung, Krakatoa, Tambora and another large-scale event not recorded historically). Acid deposition and interhemispheric distribution mechanisms are quantified and then used to obtain an order of magnitude estimate for the H2SO4 emissions from these eruptions. (Auth.)

E-36065

Colhoun, E.A., Peterson, J.A., **Quaternary landscape evolution and the cryosphere: research progress from Sahul to Australian Antarctica,** *Australian geographical studies,* Apr. 1986 24(1), p.145-167, Refs. p163-167.

In the last 30 years the growth of Quaternary studies in Australia has resulted in the development of a perspective that recognizes the importance of the ever-present southern ocean and adjacent seas, and the changing land/sea distribution about their margins. As a result modern research is now based on developing and testing models that evolved in Australia followed by comparing them with those developed elsewhere. Now, some 125 years after the first reports of former Quaternary glaciation in Australia, there is a large enough body

of literature to permit a synthesis of the data obtained from a range of environments that extends from the tropical high mountains of Irian Jaya-Papua New Guinea to the polar ice cap of East Antarctica. In essence, the new methods are still a combination of geomorphological observations made on cold climate landforms and deposits produced by the action of ice, snow and frost. Nevertheless, they employ a multidisciplinary methodology that uses radiometric dating techniques, and palaeoenvironmental analyses based on biological and inferred climatic data. (Auth. mod.)

E-36085

Tanahashi, M., Saki, T., Oikawa, N., Sato, S., **Interpretation of the multichannel seismic reflection profiles across the continental margin of the Dumont d'Urville Sea, off Wilkes Land, East Antarctica,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.1-13, 28 refs.

DLC QE350.A567 1987

The seismic stratigraphy and geological structure of the region are interpreted based on a marine geological and geophysical survey in the 1982-1983 antarctic summer season. Two sedimentary units are observed in the continental rise of this area. The upper unit is undeformed and well stratified, and probably represents the post-breakup marine Tertiary sequence. The maximum thickness is 2.0 sec (two-way travel time) in the center of the continental rise. The unit onlaps the lower one in the outer marginal high and inner continental slope side of the rise. The lower unit is slightly deformed and poorly stratified. This unit is believed to be Cretaceous pre-breakup nonmarine to shallow-marine intracontinental sediments. Maximum thickness of the unit is 3.0 sec in the outer marginal high of the rise. The acoustic basement below the continental rise is characterized by a severely block-faulted discontinuous reflection with extremely high reflectivity. It is probably composed of stretched and intruded continental igneous-metamorphic rocks of early Paleozoic and Precambrian ages. (Auth. mod.)

E-36087

Veevers, J.J., **Conjugate continental margins of Antarctica and Australia,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.45-73, 65 refs.

DLC QE350.A567 1987

The Southeast Indian Ridge opened at 96 Ma at slow rates of 4.5 mm/year to 48 Ma and 10 mm/year to 44 Ma, and then at a fast rate of 23 mm/year to the present. Three types of magnetic quiet zones were generated: (1) attenuated continental crust between a magnetic trough and the continent-ocean boundary (COB); (2) oceanic crust between the COB and A34 (Cretaceous quiet zone); and (3) east of the George V Fracture Zone, oceanic crust cut by a complex of fracture zones or affected by frequent ridge jumps. The COB on both margins is marked by (1) the contrast in the seismic character of oceanic and continental crust and (2) by a prominent magnetic anomaly, modeled as generated at the truncated edge of oceanic blocks and less magnetic continental crust. The COB trend of the Wilkes Land Margin matches its Australian counterpart in the reconstruction at breakup found by overlapping the two COB anomalies. The breakup event defines the depositional sequences of both margins. A comparison of the Antarctic sequences with those of Australia indicates that the Antarctic sequence D is synrift (Early Cretaceous), and C to A postrift, with the unconformity between D and C (K2) the breakup unconformity. (Auth. mod.)

E-36088

Hampton, M.A., Eittreim, S.L., Richmond, B.M., **Post-breakup sedimentation on the Wilkes Land margin, Antarctica,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.75-87, 32 refs.

DLC QE350.A567 1987

The post-breakup seismic-stratigraphy displayed in multichannel and high-resolution profiles on the Wilkes Land margin records the accumulation of stratified sediment along the edge of the antarctic continent after it separated from Australia. The seismic facies directly above the breakup unconformity consist of nonmarine/continental shelf, slope, and rise deposits that prograded across the subsiding margin. A major unconformity at the top of these deposits signals a possible subaerial exposure of the shelf, followed by a major rise in relative sea level. Deposits above the unconformity comprise deep-water fan, contourite, and hemipelagic facies. Contour currents sweep the modern slope and rise sea floor, degrading it in some places and depositing contourites in others. (Auth.)

E-36093

Hampton, M.A., Kravitz, J.H., Luepke, G., **Geology of sediment cores from the George V continental margin, Antarctica,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.151-174, 51 refs.

DLC QE350.A567 1987

Sediment cores collected from the continental shelf off George V Land contain Holocene diatom mud and Pleistocene glacial-marine diamicton. Cores from the continental slope contain sandy to gravelly sediment that has been reworked by strong geostrophic currents. Cores from the continental rise consist of alternating massive and laminated units that were deposited by hemipelagic and fluctuating traction-current processes, respectively. Between-core and down-core mineralogical variations observed in the sediment probably were caused by hydraulic sorting processes; there is no compelling reason to invoke multiple source terrains. The gravel-sized clasts, although lithologically heterogeneous, are represented compositionally by rocks that crop out along the George V and adjacent coasts. Most quartz sand grains have a glacially imparted morphology, with various degrees of superimposed rounding acquired in fluvial and submarine environments. A subordinate but distinct group of eolian grains probably was derived from a polar desert that once existed in front of the advancing ice cap. (Auth. mod.)

E-36094

Barnes, P.W., **Morphologic studies of the Wilkes Land continental shelf, Antarctica—glacial and iceberg effects,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.175-194, 44 refs.

DLC QE350.A567 1987

Sidescan sonar data were obtained on a track parallel to the coast from the top of Mertz Bank (200 m) to the floor of Mertz Trough (600 m). Sparse ice gouge features occur to depths of over 500 m and typically form multiple-grooved incisions a few meters deep and tens of meters wide. The dominant bed forms on both the bank top and slope are circular to subcircular depressions 30-150 m in diameter. Locally these features are associated with ice gouges. They probably represent modern ice-resting sites indicating that modern sediment is being reworked by iceberg keels to depths of 500+ m. Deep draft ice is suggested by observed freeboards and extrapolation of measured iceberg drafts. The high concentration of depressions on the slope, their absence in the trough, and their subdued appearance on the bank top probably result from modern sediment reworking of older deposits on the bank top and sedimentation in the troughs. (Auth. mod.)

E-36095
Domack, E.W., **Preliminary stratigraphy for a portion of the Wilkes Land continental shelf, Antarctica: evidence from till provenance,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.195-203, 38 refs.

DLC QE350.A567 1987

Mineralogic variation between glacial sediments within the Mertz Trough is compared to the direction of ice flow inferred from recently discovered seafloor morphology. Systematic changes in till provenance parallel to the direction of glacial transport indicate a varied pre- to late glacial stratigraphy consisting of Early Cretaceous siltstone, Triassic(?)-early Tertiary(?) sandstone, basaltic intrusive, Quaternary(?) diamictite, and arkosic sandstone. These units were partially eroded during the most recent glacial expansion and are recognized from gravel lithologies and proportions of quartz, dolerite, diamictite, and arkose within the coarse sand fraction of glacial sediments. Proportions of pyroxene, garnet, and other heavy minerals also vary in a manner consistent with the stratigraphic model. Palynologic and organic maturation data along with the provenance indicators suggest that a significant preglacial sedimentary section exists on a portion of the Wilkes Land continental shelf. (Auth.)

E-36096
Kvenvolden, K.A., Golan-Bac, M., Rapp, J.B., **Hydrocarbon geochemistry of sediments offshore from Antarctica: Wilkes Land continental margin,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.205-213, 23 refs.

DLC QE350.A567 1987

Near-surface sediments of the Wilkes Land continental margin off the George V coast and north of the Mertz Glacier contain both gaseous and heavy hydrocarbons (n-alkanes and isoprenoids, pristane and phytane) in low concentrations. Analyses of hydrocarbon gases with one through four carbon atoms show that methane is the most abundant. The hydrocarbon gases likely represent "background" from biologic and early diagenetic processes. Heavy hydrocarbons with 13 to 36 carbon atoms are dominantly of odd-carbon number, especially molecules with more than 24 carbon atoms. The molecular distribution of n-alkanes suggests that many of these compounds came from land plants. Because there are no vascular plants in Antarctica at present, the sediment n-alkanes may represent plant material that was transported from other continents, or, more likely, the compounds could be from eroded ancient sediments of Antarctica. Information from this study contributes little to understanding possible petroleum resources in the offshore area of Antarctica. Geophysical evidence, however, suggests that gas hydrates may be present in sediments of the Wilkes Land margin. (Auth.)

E-36097
Truswell, E.M., **Palynology of core samples from the *S.P. Lee* Wilkes Land cruise,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.215-218, 4 refs.

DLC QE350.A567 1987

Of nine core catcher samples collected on the antarctic continental shelf and slope during the *S.P. Lee* Cruise L1-84-AN off Wilkes Land, seven yielded palynomorphs after maceration. The organic-walled microfossils are of mixed age; Early Cretaceous spores and pollen predominate, with a minor component of early Tertiary pollen, and a single Permian pollen grain. None of the assemblages suggests that *in situ* sequences of sediments were sampled; all the palynomorphs are believed to result from recycling of older deposits. The source is probably the same sequence of strata penetrated during earlier coring in the George V Basin. The recycled suites do not permit an extension of the Aptian age assigned to that sequence; the presence of rare Cretaceous dinocysts does, however, suggest that part of the sequence may be marine or marginally marine. The highest density of recycled material occurs in clays from sites on the continental slope. (Auth.)

E-36098
Moore, G.W., **Provenance of glacial stones dredged off Wilkes Land, Antarctica,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.219-221, 9 refs.

DLC QE350.A567 1987

Ten stones, some with glacial striations, were collected in a dredge haul from the continental slope at a depth of about 1600 m about 160 km off Wilkes Land. Most of the rocks are similar to rocks cropping out on the continent, and their inferred sources are: Robertson Bay Group of Cambrian and Ordovician age; Granite Harbour Intrusives of Cambrain or Ordovician age; Beacon Supergroup of Devonian to Jurassic age; Ferrar Dolerite of Jurassic age; and possible unnamed synrift deposits of Early Cretaceous age. (Auth.)

E-36105
Harley, S.L., **Precambrian geological relationships in high-grade gneisses of the Rauer Islands, East Antarctica,** *Australian journal of earth sciences,* June 1987 34(2), p.175-207, Refs. p.206-207.

Gneisses from the Rauer Group, near Davis Base, preserve a complex structural-metamorphic and igneous history. Mafic granulites and paragneisses, preserved as relics and rafts within Proterozoic felsic orthogneisses, were affected by two early deformation episodes (D1 and D2) under granulite facies conditions. Partial melting of the mafic rocktypes occurred subsequent to these events and partly synchronous with the intrusion of syntectonic (D3) felsic orthogneisses. Preliminary isotopic data indicate that D3 can be no older than 1400 Ma. A period of near-isothermal decompression to 4 kbar at 700 C late in and following D3 resulted in the production of leucocratic melts from metasedimentary gneisses, prior to the intrusion of discordant basic dykes of probable Late Proterozoic age (1200-1000 Ma). Further deformation, under amphibolite facies conditions, caused refolding of all previous structures about open to tight southeast-plunging folds with wavelengths of up to 2 km. This scheme for the geological evolution of the Rauer group differs from that of the Proterozoic Rayner Complex in Enderby Land and MacRobertson Land in the recognition of a major Late Proterozoic tectonothermal episode, here termed D3, which pre-dates the intrusion of basic dykes, which were later deformed in a less intense event. (Auth. mod.)

E-36111
Herpers, U., Sarafin, R., **Determination of the spallogenic radionuclides Al-26 and Mn-53 in antarctic meteorites with respect to cosmic ray exposure and terrestrial ages,** *Journal of radioanalytical and nuclear chemistry,* Mar. 1987 110(1), p.191-195, 17 refs.

The spallogenic radionuclides Al-26 and Mn-53 were determined in 11 ordinary chondrites and 7 achondrites from Antarctica by non-destructive coincidence counting techniques and radiochemical neutron activation analysis, respectively. The results are discussed with respect to exposure ages, terrestrial residence times and possible genetic relationships of the meteorites investigated. The high terrestrial ages of some specimens (up to 800,000 years) are of importance for the study of the ice flow in Antarctica. (Auth.)

E-36124
Tatur, A., **Fluorine in ornithogenic soils and minerals on King George Island, West Antarctica,** *Polish polar research,* 1987 8(1), p.65-74, 19 refs.

A high content of fluorine was found in ornithogenic soils around penguin rookeries on King George I. Fluorine is inherent in 0.11% in krill *(Euphausia superba)* eaten by penguins. Fluorine content in penguins excreta increased approximately to 0.43% and after decomposition and leaching to 1.03%. The concentration grew during mineralization of organic matter in guano (up to 2.2%). In a surface layer of guano fluorine occurred in apatite. A phosphatization was noted in a subsurface zone as the result of a reaction between guano leachates and weathered volcanic rocks. In the upper part of this zone near the large rookeries a fluorine occurred in minyulite (aluminium phosphate containing potassium and fluorine) and fluorine content here reached 3.5%. Sometimes fluorine was also bound with amorphous aluminium phosphate (up to 2.0%), formed as a result of incongruently dissolving of minyulite in pure water. (Auth.)

E-36126

Gaździcki, A., **Paleontological studies on King George Island, West Antarctica, 1986,** *Polish polar research,* 1987 8(1), p.85-92, Refs. p.90-92.

Studies, especially the stratigraphy, of collections of fossils (mostly plants and invertebrates) gathered in the course of Polish antarctic expeditions, resulted in age determination of continental glaciations of West Antarctica, the earliest of which occurred on South Shetland Is. during Late Paleogene. New data for paleogeographic reconstructions of circum-antarctic regions are provided.

E-36132

Barron, E.J., **Cretaceous plate tectonic reconstruction,** *Palaeogeography, palaeoclimatology, palaeoecology,* Apr. 1987 59(1-3), p.3-29, Refs. p.26-27.

Plate tectonic reconstructions for each Cretaceous stage are produced as base maps for Cretaceous paleogeography and for oceanic and continental data. Rotation vectors for the reconstruction of the relative positions of the continents adjacent to the Indian and Pacific Oceans and the Pacific Plate, including the relative position of Antarctica to Africa, are tabulated. As the evolution of the Antarctic Peninsula is deemed controversial, the literature on this subject is briefly reviewed.

E-36133

Zinsmeister, W.J., **Cretaceous paleogeography of Antarctica,** *Palaeogeography, palaeoclimatology, palaeoecology,* Apr. 1987 59(1-3), p.197-206, Refs. p.204-206.

During the Early Cretaceous, Antarctica formed the center piece of a large landmass extending from South America across the southern latitudes to Australasia. The eastern sector of this austral landmass was dominated by broad craton consisting of East Antarctica and Australasia. The western sector which was composed of the Antarctic Peninsula and southern South America consisted of a magmatic arc along a zone of subduction extending along the southeastern Pacific. West Antarctica from the base of the Antarctic Peninsula to East Antarctica consisted of several crustal blocks that are believed to have formed a land bridge between the magmatic arc and the craton. The Late Cretaceous heralded the final breakup of the southern continents and isolation of Antarctica. Although rifting between Australia and Antarctica began in the Jurassic and continued throughout the Cretaceous, the final separation of Australia probably did not occur until the late Eocene. Paleontologic and geophysical evidence indicate that New Zealand became isolated from Antarctica prior to the end of the Cretaceous. Although faunal interchange between South America and the Antarctic Peninsula ceased during the Early Tertiary with the development of a shallow seaway, complete separation of the two plates did not occur until development of deep sea conditions in the Middle Tertiary. (Auth. mod.)

E-36134

Barron, E.J., **Global Cretaceous paleogeography—International Geologic Correlation Program Project 191,** *Palaeogeography, palaeoclimatology, palaeoecology,* Apr. 1987 59(1-3), p.207-214, 10 refs.

Five global paleogeographic maps—paleogeography for the Barremian, the Late Albian, the Late Turonian, the Coniacian, and the Early Maastrichtian—within a plate tectonic framework are presented. (Auth. mod.)

E-36136

Drewry, D.J., **Antarctic physical environment,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.6-27, 41 refs.

DLC JX4084.A5 A556 1987

The geographic and geological characteristics of Antarctica are described with emphasis on special influences of the continental ice cover upon Earth's climate, oceanographic patterns and the unusual depth of the antarctic continental shelf. Particular topics considered include the: geographical setting, geophysical structure, geological evolution and mineral resources, ice sheet, antarctic ocean and sea ice, and climate characteristics. (Auth. mod.)

E-36156

Campbell, I.B., Claridge, G.G.C., **Antarctica: soils, weathering processes and environment,** Developments in soil science, No.16, Amsterdam, Elsevier, 1987, 368p., Refs. p.341-358.

DLC S599.9.A6.C36 1987

It is assumed that the reader has little previous knowledge of Antarctica, and therefore sufficient background information is given to allow the antarctic environment as it is related to soil formation to be understood. It was not the purpose to write a treatise on all aspects of Antarctica, and hence there are many omissions in the discussions on the geology, climatology and biology of the continent. The emphasis is on only those features which have seemed relevant from a soil point of view. Following a general introductory chapter to the antarctic continent, the authors delve into the details of geology and geomorphology (basements, rocks, sediments, land forms, alluvial features); climate (wind, precipitation, climatic regions, ice-free regions, and soils); soil biology (distribution of organisms by region and soil development); physical weathering and rock disintegration (glacial action, wind action, frost action); chemical weathering (rock weathering, clay mineral formation, salt influence); soils and soil properties (pedological research, soil features development, soil depth, frozen ground); soil distribution (forming factors, moisture, parent material, time, weathering); soil salts (precipitation chemistry, saline lakes, coastal regions, deposits in soils, and origin); soil weathering and glacial history (multiple glaciations, age, chronology, reconstruction); classification of soils (system details, alternative approaches, other aridic soils); and environmental considerations (ecosystems, man's influence, soil sensitivity, stability and renewal).

E-36164

Cooper, A.K., ed, Davey, F.J., ed, **Antarctic continental margin: geology and geophysics of the western Ross Sea,** Earth science series, Vol.5B, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, 1987, 253p., For individual papers see E-36165 through E-36169, E-36174 through E-36177 and L-36170 through L-36173.

DLC QE350.A568 1987

The Ross Sea survey commenced at McMurdo Station on Feb. 2, 1984 and ended in Christchurch (Lyttleton Harbor), New Zealand on Mar. 3, 1984. The principal study areas were over the Victoria Land basin and Iselin Bank in the western Ross Sea Highlights of the Ross

Sea cruise include the geophysical mapping of the little-known Victoria Land basin where a great thickness of sedimentary rock records a history of deformation extending back into Mesozoic time. Gravity, magnetic, heat flow, and seismic data suggest an active rift zone within the basin—a rift zone tectonically coupled to the adjacent Transantarctic Mountains. Cenozoic uplift of this transcontinental mountain range can be documented by seismic data, and the uplift may reflect the most recent phase of rifting and extension between the East Antarctic craton(?) and younger crustal blocks of West Antarctica. Shallow sedimentary unconformities and structures are also documented and reflect the importance of recent glacial processes within the basin. (Auth.)

E-36165

Davey, F.J., **Geology and structure of the Ross Sea region,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.1-15, 67 refs.

DLC QE350.A568 1987

The geology of the Ross Sea region is known mainly from rock exposures along the Transantarctic Mountains to the west and Marie Byrd Land to the east. Six shallow (400 m) drillholes are sited offshore, but the geology and structure underlying the Ross Sea are mainly inferred from geophysical surveys. Continental basement consists of a Precambrian-lower Paleozoic granitic and metasedimentary complex overlain in the Transantarctic Mountains by Devonian to Triassic cover beds and extensive Jurassic basic intrusives and volcanics and in Marie Byrd Land by upper Paleozoic-Mesozoic granitoids and mid-Cretaceous mafic dykes. No younger *in situ* rocks are known until the late Oligocene (30 Ma). Upper Cenozoic rocks, in particular basic volcanics onshore and glacial-marine sediments offshore, occur extensively in the region. The Ross Sea is underlain by a thin (20-28 km) crust probably formed in post-Paleozoic times by crustal extension. Crustal extension, in late Mesozoic and Cenozoic, has led to continued rifting in the west forming the Victoria Land basin and Central trough. The Eastern basin appears to have formed mainly by downwarping resulting from crustal loading by glacial-marine sediments. Most of the sedimentary fill in the basins is of Cenozoic age, although Upper Cretaceous sediments may occur in the lower part of the section. In the Victoria Land basin, however, a deeper (6-12 km) stratified section may correspond to an upper Paleozoic-Mesozoic metasedimentary sequence. (Auth.)

E-36166

Dadisman, S.V., Ryan, H.F., Mann, D.M., **Recording and processing procedures for multichannel seismic-reflection data collected in the western Ross Sea, Antarctica,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.17-26, 3 refs.

DLC QE350.A568 1987

During 1984, over 2300 km of multichannel seismic-reflection data were recorded by the U.S. Geological Survey in the western Ross Sea and Iselin Bank regions. A temporary loss and sinking of the streamer led to increasing the streamer tow depth to 20 m, which resulted in some attenuation of frequencies in the 30-50 Hz range but no significant difference in resolution of the stacked data. Severe water bottom multiples were encountered and removed by dip-filtering, weighted stacking, and severe post-NMO muting. (Auth.)

E-36167

Cooper, A.K., Davey, F.J., Behrendt, J.C., **Seismic stratigraphy and structure of the Victoria Land basin, western Ross Sea, Antarctica,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.27-66 + plates, 68 refs.

DLC QE350.A568 1987

Multichannel seismic-reflection data across the Victoria Land basin (VLB) show a broad half-graben filled with up to 14 km of sedimentary rock. An active rift zone, the Terror rift, extends between Ross Island and Cape Washington. Extensional deformation and down-faulting of the VLB and adjacent platform regions may have commenced in Middle Jurassic to Early Cretaceous time during an early rifting period of Gondwana breakup. Major sediment-infilling followed this early rift period. Intense deformation resumed in a late rifting period, coeval with rapid uplift of the Transantarctic Mountains since Eocene time. Extensive intrusive and volcanic rocks have been emplaced throughout the southern part of the VLB during this late rifting period. In the north, the VLB terminates near Cape Washington, but to the south, the basin probably extends beneath Ross Island and the Ross Ice Shelf. The VLB and Terror rift may be part of a regional north-south structural zone crossing northern Victoria Land and areas south of the VLB. In the VLB region, crustal extension and rifting between East and West Antarctica have apparently acted episodically since Jurassic time. (Auth.)

E-36168

Karl, H.A., Reimnitz, E., Edwards, B.D., **Extent and nature of Ross Sea unconformity in the western Ross Sea, Antarctica,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.77-92, 18 refs.

DLC QE350.A568 1987

High-resolution seismic-reflection data recovered in the western Ross Sea during 1984 confirm the suspected existence of a regional unconformity of late Tertiary(?)-Quaternary(?) age. This Ross Sea unconformity (RSU), often lies within 2 m of the sea floor and on seismic-reflection lines is nowhere deeper than 40 m below the sea floor. It is identified acoustically as a strong angular unconformity or a paraconformity. It is correlated with the unconformity at 42 m subbottom penetrated at DSDP Leg 28 drillsite 273 and mapped over most of the western Ross Sea. The data support the hypothesis that the RSU records the climax advance of the West Antarctic Ice Sheet. Timing of the formation of the RSU is controversial, because biostratigraphic zonations upon which the age is based are still being refined and the section is heavily reworked. (Auth.)

E-36169

Cooper, A.K., Davey, F.J., Cochrane, G.R., **Structure of extensionally rifted crust beneath the western Ross Sea and Iselin Bank, Antarctica, from sonobuoy seismic data,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.93-118, 37 refs.

DLC QE350.A568 1987

Sonobuoy seismic data have been analyzed using slope-intercept and ray-tracing techniques. The Victoria Land basin underlies the westernmost Ross Sea. The upper 6-8 km of the nearly 14 km thick sedimentary section in the basin have variable velocity gradients and refraction velocities of 1.7-5.6 km/sec. Higher velocities of 4.9-5.6 km/sec occur in the deeper 6-8 km of the rift basin fill and may result

from diagenesis, sediment compaction, and active tectonism. Acoustic basement and underlying igneous and metamorphic basement are probably Precambrian to Jurassic sedimentary and igneous rocks that crop out nearby in Victoria Land. Reflections from 15 to 21 km depth are occasionally detected in sonobuoy and MCS data and may be from layered bodies within the lower crust, from the top of mantle, or from deep-seated rift structures. Iselin Bank, a basement ridge that protrudes across the continental shelf edge, is incised by narrow rift grabens. At the east edge of the bank, continental basement rocks abut oceanic crust at a possible transform fault. The west edge of the bank has subsided to oceanic depths. Crustal extension in the Ross Sea region since late Mesozoic time is likely and would explain the structures observed in sonobuoy and MCS data. (Auth.)

E-36174

Edwards, B.D., Lee, H.J., Karl, H.A., Reimnitz, E., Timothy, L.A., **Geology and physical properties of Ross Sea, Antarctica, continental shelf sediment,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.191-216, 40 refs.

DLC QE350.A568 1987

Sixteen gravity cores collected from the western Ross Sea continental shelf recovered Holocene diatomaceous sediment overlying Pleistocene(?) diamicton. All cores bottomed in either normally consolidated or overconsolidated diamicton as determined by undrained vane shear and constant-rate-of-strain consolidation testing. Physical properties of Ross Sea shelf sediment are in agreement with the range of values reported for similar high-latitude sediment from both Antarctica and the sub-Arctic. The normally consolidated diamicton has low (13-20 kPa) vane shear strength whereas diamicton exhibiting light to heavy levels of overconsolidation has high values (23-86 kPa). The lightly overconsolidated diamicton likely represents loading of a previously deposited glacial-marine sequence, whereas the heavily overconsolidated diamicton can develop either through deposition of basal till by lodgement or by loading of a previously deposited glacial-marine sequence. Deposition by lodgement is the more likely case. The observed level of overconsolidation could have been induced either by removal of overlying sediment or by the weight of a previously grounded ice sheet. Erosion of overlying sediment is unlikely given the absence of reworked sediment and the high (to 86 kPa) shear strength of the overconsolidated diamicton. These possibilities are discussed. (Auth.)

E-36175

Rapp, J.B., Kvenvolden, K.A., Golan-Bac, M., **Hydrocarbon geochemistry of sediments offshore from Antarctica,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.217-224, 21 refs.

DLC QE350.A568 1987

Hydrocarbon gases containing one through four carbon atoms, *n* alkanes with 13 through 36 carbon atoms, and pristane and phytane have been identified in near-surface sediment recovered in nine gravity cores in the western Ross Sea offshore from Victoria Land. Methane is the most abundant of the hydrocarbon gases found and probably results from biologic processes, as do ethene and propene. The origin of the other hydrocarbon gases may result from biologic or early diagenetic processes. The *n* alkanes, with their strong odd-carbon-number dominance, probably represent the products of continentally derived higher plants. Because, at present, Antarctica is essentially devoid of higher plants, the source of the plant material may be other continents or, more likely, ancient antarctic plants. The low concentrations of methane and heavy *n* alkanes and the pristane/phytane ratios greater than 1.0 suggest oxidizing environments of deposition for these sediments. No direct evidence was obtained concerning the possible petroleum potential of the Ross Sea area, but previous Deep-Sea Drilling Project data on hydrocarbon gas concentrations and salinity profiles suggest that gas hydrates are present in the sediments of the Ross Sea. (Auth.)

E-36176

Barron, J.A., Burckle, L.H., **Diatoms from the 1984 USGS antarctic cruise in the Ross Sea,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.225-230, 37 refs.

DLC QE350.A568 1987

The diatom assemblages of 27 samples from 16 gravity cores taken in the Ross Sea in 1984 by the U.S. Geological Survey are tabulated and discussed. The down-core sequence of lithologies contains diatoms that closely resemble those documented by Kellogg and Truesdale (1979a) from the Ross Sea. A Holocene surficial layer rich in diatoms overlies a diamicton that contains a poorly preserved mixture of probable Quaternary diatoms and reworked Tertiary diatoms. It is presumed that the diamicton represents material reworked and deposited by grounded ice during the last glacial maximum. (Auth.)

E-36177

Wong, F.L., Barrett, P.J., Gamble, J., Howell, D.G., **Petrography of rock samples dredged from Iselin Bank, Ross Sea, Antarctica,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.231-253, 50 refs.

DLC QE350.A568 1987

Two dredge stations on the east flank and crest of Iselin Bank, Ross Sea, yielded a wide variety of lithologies that are similar to rock types exposed in northern Victoria Land. The main rock types dredged from the east flank of the bank include, in order of abundance, granitoids, gabbro and diabase, quartz schists, and quartzarenites. Those from the crest include basalt, granitoids, and graywacke. Moderate rounding and occasional striae indicate glacial transport. The dominance of at least one rock type at each site (granitoids and basalt, respectively), however, suggests a local component, and the lithologies suggest that Iselin Bank bedrock may be similar to that of northern Victoria Land. (Auth.)

E-36178

Shemenda, A.I., Grokhol'skiĭ, A.L., **Geodynamics of the South Antilles region,** *Geotectonics,* 1986 20(1), p.58-66, Translated from Geotektonika. 43 refs.

Analysis of the geodynamics of processes of lithospheric subduction under the South Sandwich arc, spreading in its rear, and gravity anomalies shows that an eastward asthenosphere current evidently exists beneath the South Antilles trough. This current flows between "lithospheric roots" of continental blocks constituting the northern and southern Scotia ridges. On the assumption of this having existed for about 30 m.y., a model of south Antilles trough development is proposed consistent with the geologic and geophysical data extant. A paleogeodynamic reconstruction of the region for the last 20 m.y. is presented. Some features of the initial stage of opening of the eastern reaches of the Scotia Sea are explained. (Auth.)

E-36207
Gordon, J.E., **Radiocarbon dates from Nordenskjöld Glacier, South Georgia, and their implications for Late Holocene glacier chronology,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.1-5, 16 refs.

Recent recession of Nordenskjöld Glacier has exposed *in situ* a bed of peat formerly covered by the glacier. Radiocarbon dates on the peat allow an estimate of the minimum duration of a period of vegetation development and less extensive ice cover than occurs at present between 2230 and 3330 years BP (equivalent to calendar age ranges of 2122-2334 and 3395-3689 years BP). Subsequent glacier expansion culminated during the 17th to 19th centuries AD and involved an ice-front advance of at least 0.4 km. (Auth.)

E-36209
Storey, B.C., Macdonald, D.I.M., **Sedimentary rocks of the Ellsworth-Thiel Mountains ridge and their regional equivalents,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.21-49, 60 refs.

Sedimentary rocks of the Ellsworth-Thiel mountains ridge are divided into three major units: a volcaniclastic unit, a red sandstone unit and a mixed carbonate-clastic unit. The units are correlated with neighboring Cambrian successions and are related to an intracontinental extensional environment. The volcaniclastic unit occurs within the Thiel Mountains, is formally defined as the Mount Walcott Formation and was deposited in a deepening shoreline-shelf-outer shelf or base of slope marine setting bordering volcanic islands. The mixed carbonate-clastic unit of the Nash and Martin hills, termed the Nash Hills Formation, represents shallowing upwards events in a shallow, storm-influenced shelf adjacent to a productive clastic shoreline. The red sandstone unit, termed the Mount Johns Formation, was deposited by alluvial processes and may represent a widespread regression. If the correlations are correct, tectonic events can now be matched between Greater and Lesser Antarctica during the Cambrian period. (Auth.)

E-36217
Kerr, R.A., **Ocean drilling details steps to an icy world,** *Science,* May 22, 1987 Vol.236, p.912-913.

Shipboard analyses of sediment cores, collected by the deep-sea drilling ship *Resolution* from the bottom of the Weddell Sea, appear to support the theory that Antarctica was unglaciated before 40 m.y.a. This evidence, which runs counter to suggestions by some researchers who claim major ice sheets covered Antarctica earlier than 40 m.y.r., is discussed along with a review of antarctic morphological and climatological changes over the millennia.

E-36249
Czajkowski, S., Rösler, O., **Fossil plants from the Fildes Peninsula, King George Island: morphology of leaf impressions** [Plantas fósseis da Península Fildes, Ilha Rei Jorge (Shetland do Sul): morfografia das impressões foliares], *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.99-110, In Portuguese with English summary. 13 refs.

This paper deals with the description of fossil plants (leaf impressions) collected in tuffaceous rocks of Fildes Peninsula, King George I. All taxa here described were already known from other localities of the Antarctic Peninsula or Patagonia. However, all but one of these taxa are described for the first time from this part of King George I. This flora is most closely similar to that of Seymour I. and probably represents an early Tertiary, humid temperate forest. (Auth.)

E-36252
Lyra, C.S., **Tertiary sediment palynology at Fildes Peninsula, King George Island, South Shetland Islands, and some paleoenvironmental considerations** [Palinologia de sedimentos Terciários da Península Fildes, Ilha Rei George (Ilhas Shetland do Sul, Antártica) a algumas considerações paleoambientais], *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.137-147, In Portuguese with English summary. 23 refs.

Results are presented of palynological studies of 19 samples from Tertiary sediments collected in Jan., 1984, on Fildes Peninsula. A total of 18 species of spores and pollen grains of pteridophytes, angiosperms (mainly *Nothofagidites)* and gymnosperms (all from the Podocarpaceae family) were recognized from Leaves Hill and from near Suffield Point. In samples from Leaves Hill palynomorphs are sparse and poorly preserved; they suggest an early Tertiary age for the sediments. The presence of nannofossils (coccoliths) and microscopic analysis of organic residues suggest a marine influence in the depositional environment. The fossil assemblage from near Suffield Point suggests a late Eocene-early Oligocene age, and is characteristic of a lowland forest, under a wet-temperate paleoclimate. (Auth.)

E-36254
Trouw, R.A.J., Ribeiro, A., Panciullo, F.V.P., **Geology of Elephant Island, South Shetland Islands** [Contribuição à geologia da Ilha Elefante, Ilhas Shetland do Sul], *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.157-169, In Portuguese with English summary. 13 refs.

Three metamorphic zones are identified in petrographic and microtectonic studies of rocks from 10 localities on Elephant I. Phyllites of lower greenschist or zeolite facies in the north, with intercalations of thin marble, metabasite with relict piroxenes, and volcanic metaconglomerate, are separated by a blueschist belt from schists, belonging to the epidote-amphibolite facies, with porphyroblasts of albite, garnet and hornblende, in the south. The structural history, including 3 distinct phases of deformation, is almost identical for the northern and southern part of the island. Microtectonic analysis demonstrated that the main metamorphic minerals grew early during the second phase of deformation. The boundary between the lower grade northern part and the higher grade southern part seems to be gradational and is probably not a fault, as proposed in the literature. (Auth. mod.)

E-36260
Zinsmeister, W.J., **Unusual nautilid occurrence in the Upper Eocene La Meseta Formation, Seymour Island, Antarctica,** *Journal of paleontology,* July 1987 61(4), p.724-726, 11 refs.

The presence of large numbers of phragmocones of *Eutrephoceras* and *Aturia* in an upper Eocene beach deposit of the La Meseta Formation on Seymour I. is the first known occurrence of beach-drifted accumulations of nautilid shells in the fossil record and may also represent the first documentation of a mass stranding of nautilids in the Cenozoic. (Auth.)

E-36265
Fournier, H.G., Corte, A.E., Gasco, J.C., Moyano, C.E., **Very conductive layer below the permafrost of Seymour and Robertson Islands in the eastern Antarctic Peninsula,** *Cold regions science and technology,* Aug. 1987 14(2), p.155-161, 25 refs.

The interpretation of magnetotelluric (M-T) sounding curves over Seymour and Robertson islands in the Antarctic Peninsula implies a very conductive layer below the permafrost. The curves are analyzed above the period of 0.1 s. and account is taken of the resistive perma-

frost layer. This very conductive layer is here composed of 16 m at 0.6 ohm-m and 17.5 m at 0.3 ohm-m, respectively. (Auth.)

E-36267

Barrett, P.J., **Oligocene sequence cored at CIROS-1, western McMurdo Sound,** *New Zealand antarctic record,* 1987 7(3), p.1-7, 7 refs.

CIROS-1, sited 12 km off Butter Point in western McMurdo Sound, was successfully drilled to a depth of 702 m below the sea floor in marine glacial strata dating back to the Early Oligocene (based on preliminary studies of foraminifera and diatoms). The continuous nature of the core makes it an excellent record of glacial advances and retreats and will make it easier to date using microfossils and paleomagnetic stratigraphy. The core records changes in sand and pebble composition that reflect the progressive erosion of the Transantarctic Mountains. The abundance of coaly fragments and the dolerite boulders near the bottom of the hole suggest proximity to local bedrock of Permian coal measures intruded by Jurassic dolerite. An asphaltic residue was found in sand 632 m down the hole. It indicates that petroleum has been generated in the Victoria Land basin and at this site was trapped but later released naturally. (Auth.)

E-36270

Chinn, T.J.H., McSaveney, M.J., **On the flooding of Vanda Station,** *New Zealand antarctic record,* 1987 7(3), p.23-31, 10 refs.

During the 18-year period 1969-1987, Lake Vanda has risen in two steps separated by a 10-year interval of equilibrium from 1971 to 1981. As the lake rises, its area increases, and the volume lost to ablation also increases. A mean ablation loss of 0.305 m/a has been calculated from a 10-year period when ablation balanced inflow from the Onyx River. Vanda Station now is only 4.42 m above lake level and flooding appears inevitable. The period of time left before the Station is flooded may be predicted from predictions of lake rises, mean annual ablation loss and the area of the lake. Linear extrapolations of the rises over the past 18 and 10 years, (which take no account of the accelerating increase in rises) suggest that the Station will be flooded in 16 and 18 years, respectively. However, an extrapolation of the accelerating increase over the past 10 years suggests a 23% probability that the Station will be flooded in 2.5 years, during the 1989-90 summer season. The cause of the rise is the only significant inflow into Lake Vanda, the glacier meltwater fed Onyx River, whose annual discharge has systematically increased by nearly an order of magnitude over the last 10 years. (Auth.)

E-36295

Kamp, P.J.J., Fitzgerald, P.G., **Geologic constraints on the Cenozoic Antarctic-Australia-Pacific relative plate motion circuit,** *Geology,* Aug. 1987 15(8), p.694-697, 29 refs.

In a revised interpretation of the sea-floor spreading pattern in the southwest Pacific Ocean, two investigators predicted that the modern Australia-Pacific plate boundary through New Zealand formed about 35 Ma and has accommodated about 800 km of relative motion. Geologic constraints onshore in New Zealand, however, suggest that the modern plate boundary formed about 23 Ma and has accommodated only 500 km of relative motion. The 300 km of additional displacement must have been accommodated elsewhere in the Antarctica-Australia-Pacific plate circuit. Lithospheric extension between East and West Antarctica, which formed the Transantarctic Rift system, accounts for at least 138 km of the additional displacement before the modern plate boundary formed in New Zealand. (Auth.)

E-36312

Gleadow, A.J.W., Fitzgerald, P.G., **Uplift history of the Transantarctic Mountains: new evidence from fission track dating of basement apatites in the Dry Valleys area, southern Victoria Land,** *Earth and planetary science letters,* Mar. 1987 82(1/2), p.1-4, 49 refs.

Fission track analysis of apatites from basement rocks of Wright Valley in Victoria Land provides information about the timing, the amount and hence the rate of uplift of the Transantarctic Mountains in this area. Apatite ages increase systematically with elevation, and a pronounced break in the age versus elevation profile has been recognized at about 800 m on Mt. Doorly near the mouth of Wright Valley. The apatite age of about 50 Ma at this point approximates the time at which uplift of the mountain range began. Samples lying above the break in slope lay within the apatite fission track annealing zone prior to uplift, during a Cretaceous to Early Cenozoic period of relative thermal and tectonic stability. At the lower elevations samples had a zero apatite fission track age before the onset of rapid uplift and have track length distributions indicating rapid cooling. The occurrence and pattern of differential uplift across the Transantarctic Mountains can be estimated from the vertical offsets of different apatite fission track age profiles sampled across the range. These show the structure of the mountain range to be that of a large tilt block, dipping gently to the west under the polar ice-cap and bounded by a major fault zone on its eastern side. Offset dolerite sills at Mt. Doorly show the mountain front to be step-faulted by 100 m or more down to the McMurdo Sound coast from an axis of maximum uplift just inland from Mt. Doorly. (Auth.)

E-36313

Black, L.P., McCulloch, M.T., **Evidence for isotopic equilibration of Sm-Nd whole-rock systems in early Archaean crust of Enderby Land, Antarctica,** *Earth and planetary science letters,* Mar. 1987 82(1/2), p.15-24, 30 refs.

Sm-Nd isotopic data indicate that differential REE mobility occurred on a whole-rock scale during transitional amphibolite- to granulite-facies regional metamorphism (700 C, 7kbar) in early Archaean rocks (3930 Ma) of the Napier Complex. The degree of mobility is independent of metamorphic grade but correlates directly with development of tectonic fabric. Whole-rock samples with D3-M3 internal fabrics lie along an array corresponding to an age of 2410 Ma, whereas samples preserving only earlier fabrics preserve an older, albeit imprecisely defined isochron age. In contrast to a widely held belief, such changes did not require the presence of a large hydrous fluid flux. If the mechanism responsible for Sm-Nd resetting at this locality is more widespread than is currently recognized, isolated Sm-Nd model ages, particularly in complex terrains should be treated with caution. (Auth.)

E-36314

Warren, R.G., Hensen, B.J., Ryburn, R.J., **Wollastonite and scapolite in Precambrian calc-silicate granulites from Australia and Antarctica,** *Journal of metamorphic geology,* Apr. 1987 5(2), p.213-223, Refs. p.222-223.

Scapolite, wollastonite, calcite, diopside, grossular-andradite garnet and sphene occur in calc-silicate rocks in the granulite terrain of the Arunta Block, central Australia. Evidence from the surrounding granulites shows that in one locality, the calc-silicate rocks had undergone late isobaric hydration; in another locality, minor uplift had occurred soon after peak *P-T* conditions. In both, scapolite had partly broken down to plagioclase-calite. A calc silicate rock from the granulite terrain of Enderby Land contains scapolite, wollastonite, calcite, diopside, quartz and sphene; this assemblage also indicates low CO2 activities. In this rock, wollastonite has broken down to calcite-quartz, to indicate isobaric cooling without influx of hydrous fluid. (Auth. mod.)

E-36332
Vetter, U., Tessensohn, F., **S- and I-type granitoids of north Victoria Land, Antarctica, and their inferred geotectonic setting,** *Geologische Rundschau,* Feb. 1987 76(1), p.233-243, With German, French, and Russian summaries. 34 refs.

It was known in 1979/80 that in north Victoria Land there existed a Cambro/Ordovician and a Devonian/Carboniferous granitoid generation, which, in analogy to Australia, were taken to be related to two different orogenetic events. Geological, petrographical and geochemical investigations, together with radiometric age dating, revealed that this is true only for the older granite generation. The younger generation is in fact anorogenic. At the same time, it became obvious that the S- and I-type classification did not completely fit the observed field data. At this point a 1982 subdivision of the I-types into a "Cordilleran" and a "Caledonian" suite offered a solution to account for the observed irregularities. Plate tectonic models based on evidence independent from the granite classification were developed for this part of the active Gondwana margin. The characteristics of the older, Cambro/Ordovician granitoids allow a perfect accommodation in the model of an active margin above a subduction zone as derived from other evidence. For the younger (Devonian/Carboniferous) granitoids, however, the postulated tectonic setting (post-collisional uplift and faulting) could not be verified in north Victoria Land. It is concluded that the 1982 classification is applicable in its petrographic and geochemical aspects but that the tectonic environment postulated for the production of "Caledonian" I-type granitoids may not be the same in all investigated areas. (Auth. mod.)

E-36333
White, C.M., Craddock, C., **Compositions of igneous rocks in the Thurston Island area, Antarctica: evidence for a Late Paleozoic-Middle Mesozoic Andinotype continental margin,** *Journal of geology,* Sep. 1987 95(5), p.699-709, 31 refs.

Outcrops in the Thurston Island area of West Antarctica consist primarily of plutonic rocks that range in composition from gabbro to granite and yield isotopic dates from 347 to 97 Ma. They intrude amphibolite-grade gneisses of probable early Paleozoic or late Precambrian age and are associated with a suite of basaltic to rhyolitic volcanic rocks of unknown, but probably pre-Tertiary, age. The plutonic rocks have mineralogical and chemical compositions typical of I-type batholiths, and most have calc-alkaline geochemical affinities. The assemblage of igneous rocks in the Thurston Island area resembles the igneous suites at active (Andinotype) continental margins; its existence is evidence for a long period of subduction in this part of West Antarctica. (Auth.)

E-36372
Sanz, J.L., Acosta, J., Herranz, P., Gonzalez, F., **Preliminary results of geological investigations carried out during the *Antártida 8611* cruise** [Resultados preliminares de la investigación geológica realizada durante la campaña *Antártida 8611*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.185-196, In Spanish with English summary.

The Scotia Arc is the name generally applied to the ample submarine physiographic features that join southern South America to the Antarctic Peninsula. This is the geographic zone where the *Antártida 8611* cruise was carried out during which a total of 3447 km of sparker seismic profiles, 3549 km of 3.5 KHz and echosounding, and 102 km of side scan sonar profiles were recorded. Also 72 sediment samples and 286 rock samples were taken. In this preliminary report, some results are reviewed. (Auth.)

E-36375
Ortiz, R., **Eruption mechanism of recent volcanic activity on Deception Island** [Mecanismo de erupción de la reciente actividad volcánica en Decepción], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.217-227, 7 refs., In Spanish with English summary.

The volcanic activity on Deception I. discussed in this paper occurred at the border of a caldera and is associated with ring faults. Analysis of samples obtained from the 1848, 1967, 1969 and 1970 eruptions shows that the first 3 produced mainly strombolian material, whereas the deposits for 1970 consist of a phreato-magmatic sequence.

E-36376
Ortiz, R., Valentín, A., Grimalt, J., **Preliminary study of fumarolic activity on Deception Island** [Actividad fumaroliana en Decepción. Estudio preliminar], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.229-237, 8 refs., In Spanish with English summary.

Fumarolic gases from Deception I. were sampled and analyzed. The fluids are considered to be produced by the ebullition of shallow aquifers receiving a convective gaseous inflow from the underlying magma chamber. Acid gases are absorbed by the aquifers, while H2, N2, O2, CH4 and He increase their relative concentration. (Auth.)

E-36383
Mateu, G., **Contribution to sedimentary micropaleontology research in Antarctica** [Contribución al conocimiento de la micropaleontología sedimentaria de la Antártida], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.325-341, 33 refs., In Spanish with English summary.

The study of foraminifera in sediment samples from the continental shelf of northwestern Antarctic Peninsula shows the presence of populations composed mainly of agglutinated forms (51.5%), siliceous species (23%), calcareous species (21%) and less than 5% of planktonic forms. These populations constitute an euryhaline shallow water arenaceous facies, where there is a lesser incidence of calcareous forms, as compared with the fresh shelf water biofacies related with thawing and the polybathymetric lisocline. The high rate of siliceous forms (Miliammina) is possibly correlated with the high level of silicate concentration in Antarctic Convergence waters and with recent volcanic eruptions. (Auth.)

E-36394

Mazzullo, J., Anderson, J.B., **Grain shape and surface texture analysis of till and glacial-marine sand grains from the Weddell and Ross seas, Antarctica,** Clastic particles; scanning electron microscopy and shape analysis of sedimentary and volcanic clasts. Edited by J.R. Marshall, New York, Van Nostrand Reinhold Co., 1987, p.314-327, 22 refs.

DLC QE471.2.C57

The feasibility of using the Fourier grain shape technique to distinguish sands from different glacial subenvironments is examined in an attempt to differentiate subglacially derived till sands from englacially and supraglacially derived glacial-marine sands. This is followed by a study of the surface textures of glacial-marine and till sands to examine the origin of any grain shape differences which might exist in these sands. It is concluded that the Fourier technique offers a relatively rapid and quantitative means by which to distinguish glacial sands of different subenvironments.

E-36398

Kvenvolden, K.A., Rapp, J.B., Golan-Bac, M., Hostettler, F.D., **Multiple sources of alkanes in Quaternary oceanic sediments of Antarctica,** *Organic chemistry,* 1987 11(4), p.291-302, Refs. p.301-302.

Normal alkanes, isoprenoid hydrocarbons, triterpanes, and steranes are present in low concentrations offshore Antarctica in near-surface, Quaternary sediment of the Wilkes Land continental margin and of the western Ross Sea. The distributions of these hydrocarbons are interpreted relative to possible sources and processes. The hydrocarbons appear to be mixtures of primary and recycled material from marine and terrigenous sources. The *n*- alkanes are most abundant and are characterized by two distinct populations, one of probable marine origin and the other likely from terrigenous, vascular plant sources. Isoprenoid hydrocarbons are partially recycled and mainly of marine origin; the dominance of pristane over phytane suggests oxic paleoenvironmental conditions. Both modern and ancient triterpanes and steranes are present, and the distribution of these indicates a mixture of primary and recycled bacterial, algal, and possible higher-plant materials. Although the sampled sediments were deposited during the Quaternary, they apparently contain a significant component of hydrocarbons of pre-Quaternary age. (Auth. mod.)

E-36402

Rowell, A.J., Rees, M.N., Braddock, P., **Silurian marine fauna not confirmed from Antarctica,** *Alcheringa,* 1987 Vol.11, p.137, 4 refs.

Silurian corals have been described previously from specimens labelled as having been collected from the Cloudmaker moraines of the Beardmore Glacier. Because Silurian faunas are otherwise unknown on the continent, and because there is some doubt that these collections came from Antarctica, verification of their occurrence has considerable paleogeographic importance. Recent re-examination of the Cloudmaker moraines failed to confirm the presence of marine rocks of this age: it is concluded, therefore, that the locality data on the coral material probably have been misrecorded, and that fossiliferous Silurian strata remain unknown from Antarctica. (Auth.)

E-36403

Heumann, K.G., Gall, M., Weiss, H., **Geochemical investigations to explain iodine-overabundances in antarctic meteorites,** *Geochimica et cosmochimica acta,* Sep. 1987 51(9), p.2541-2347, 30 refs.

Iodine, bromine, and chlorine concentrations were determined in different antarctic meteorite specimens (eucrites, high-iron and low-iron chondrites) with isotope dilution mass spectrometry. In all antarctic meteorites I-overabundances have been analyzed compared with the concentrations for non-antarctic meteorites of the same class. Half of the antarctic specimens show especially high concentrations of more than 1 microgram/g. A similarly high enrichment effect in antarctic meteorites was not found for Br and Cl, but smaller Cl excesses could be observed in some eucrites and high-iron chondrites. A significant decrease of the I concentration was determined from the surfaces to the centers of the rocks. Analyses of atmospheric halogens show that CH3I is probably responsible for the I-overabundance in antarctic meteorites and rocks. Chloride and bromide are found in particles derived from sea-spray in antarctic aerosols. Deposition of halogens in antarctic snow near the coast shows I/Cl ratios 10-190 higher than the average value for seawater. The corresponding Br/Cl ratios are in the same range as seawater. A preliminary hypothesis for a geochemical I cycle in Antarctica is constructed, taking into consideration long-distance and short-distance transportation of different I compounds from the coast to inland Antarctica. (Auth.)

E-36404

Matsumoto, G.I., **Steranes and triterpanes in the Beacon Supergroup samples from southern Victoria Land in Antarctica,** *Geochimica et cosmochimica acta,* Oct. 1987 51(10), p.2663-2671, 41 refs.

Steranes and triterpanes in Beacon Supergroup samples (sedimentary rock and silicified wood) from Allan Hills and Carapace Nunatak of southern Victoria Land in Antarctica were studied to elucidate sources of organic materials, sedimentary paleoenvironment and thermal history after deposition. Relative abundances of C27, C28 and C29 steranes and visual kerogen results of Beacon Supergroup samples from Allan Hills imply that organic materials in the sedimentary paleoenvironments are contributed mainly by vascular plants with some influence of microorganisms, while those of the Carapace Nunatak sample may be largely due to fern spores. The pristane/phytane and pristane/heptadecane ratios of the samples were generally close to unity and between 0.50 and 0.99, respectively, suggesting that the sedimentary paleoenvironment was shallow lacustrine with alternating oxic and anoxic conditions. Variable maturities probably reflect thermal effects of basaltic dikes on the Beacon Supergroup at Allan Hills and Carapace Nunatak during Jurassic time. Thermal stresses on the Beacon Supergroup prior to basaltic intrusion have been estimated to be quite low, so the paleotemperatures of this formation have been quite low. (Auth.)

E-36415

Le Pichon, X., Huchon, P., Barrier, E., **Pangea, Geoid and the evolution of the western margin of the Pacific Ocean,** Formation of active ocean margins, edited by N. Nasu et al, Tokyo, Terra Scientific Publishing Co., 1985, p.3-42, Refs. p.39-42.

DLC QE606.F67

Absolute motions are used with respect to the deep convection related geoid. These motions coincide with hot spots framework motions for the last 8 MA. It is shown that continental drift activity has peaked 80 to 54 MA ago and that this peak is not related to an increase in global oceanic accretion. The argument used is based in part on the evolution of the global sea-level. The dispersal of Eastern Pangea in terms of absolute motions is analyzed in detail, paying special attention to the evolution of marginal basins. The analysis suggests that the motions of the continents may be in great part controlled by the deep convection responsible for the geoid configuration whereas the evolution of the shallow oceanic thermal boundary layer shows no obvious correlation with deep convection. It is proposed that the independent motions of the continents may play a much more significant role than previously thought. (Auth. mod.)

E-36416

Sato, H., Tohara, T., **Geochemical characteristics of back-arc basin basalt,** Formation of active ocean margins, edited by N. Nasu et al, Tokyo, Terra Scientific Publishing Co., 1985, p.399-410, Refs. p.408-410.

DLC QE606.F67

Geochemical data on back-arc basin basalt (BABB) are compiled and compared with normal mod-oceanic ridge basalt (N-type MORB), oceanic island basalt (OIB), and island arc volcanic rocks. The primary magma composition of BABB was estimated, and it is characterized by rather low MgO (10-13 wt.%) and FeO* (7-9 wt.%), and high Al2O3 (15-17.5 wt.%) contents compared with that of OIB. BABB can be classified into 3 types according to the incompatible element abundances and the isotopic composition of Sr. BABB from the Scotia Sea, Mariana Trough, Shikoku and Parece Vela Basins has intermediate geochemical characteristics between N-type MORB and the associated island arc tholeiite. (Auth. mod.)

E-36444

Holler, P., **Geotechnical properties of antarctic deep sea sediments,** *Meteor Forschungsergebnisse. Reihe C Geologie und Geophysik,* 1985 No.39, p.23-36, 34 refs.

Sedimentological and geotechnical analyses were carried out on 2 undisturbed large diameter deep sea cores from the antarctic sector of the Atlantic Ocean. One core, from a silled basin within the Bransfield Strait, is characterized by fine grained hemipelagic material and turbidite layers. The other core, from the continental slope of the Weddell Sea represents a typical glacial marine environment. The variations of physical properties, as related to both an increasing overburden pressure (or depth below top of core) and/or to lithological changes, are discussed. With increasing overburden pressure only small variations of physical properties were observed. (Auth. mod.)

E-36446

Quilty, P., **Antarctica's frozen past,** *Australian natural history,* Summer 1986-87 22(3), p.98-101.

A brief overview is given of the geological history of Antarctica. Traces of early ages deposited as fossil materials have been uncovered in many geological studies. The supercontinent, Gondwana, is described, its breakup starting about 160 mya with continents drifting apart over a long ensuing time period. Methods used to recreate the historical geology and the evidence supporting the reconstructions are pointed out.

E-36453

Ivanov, V., Grikurov, G., Masolov, V., **Geology of the Antarctic,** *Science in the USSR,* Mar.-Apr. 1987 No.2, p.100-111.

An outline of the history of Soviet geological studies in the Antarctic is presented, and the theory that Antarctica is likely to actively disintegrate, under the action of a system of transcontinental rifts, into major blocks gradually submerging into the ocean is discussed. Diagrams of geological and geophysical studies, of the antarctic ice cover and of the rift zones in Antarctica, are included.

E-36466

Nagai, H., Momose, K., Funaki, M., **Magnetic properties and remanent magnetization of a mixture of Fe-Ni alloys simulated to the Yamato 74646 (LL6) chondrite,** *Journal of geomagnetism and geoelectricity,* 1987 39(7), p.431-436, 6 refs.

The present work investigates magnetic properties of a mixture of Ni-Fe alloys simulating the Yamato 74646 (LL6) chondrite. The alloys of Fe and Ni metals of 99.99% purity each were prepared in an induction furnace under argon atmosphere. Powder samples were obtained by grinding the alloy ingot (grain size is 80-200 micron in diameter) and then embedded in the center of a heat-proof brick (2.5 cm x 2.5 cm in diameter and height) for the measurement of magnetic properties. Several mixtures of Ni and Fe-Ni powder samples were investigated in terms of the phase transition temperature and the Curie temperature *vs* room temperature. The alloys were compared to the metal content of the Yamato 74646 chondrite and the results are discussed. (Auth. mod.)

E-36484

Danilov, I.D., **Problems of global glaciation during the Quaternary,** *Polar geography and geology,* Apr.-June 1987 11(2), p.127-140, Translation of Timiriazevskaia Sel'skokhoziaistvennaia Akademiia. Izvestiia, No. 1: 109-116, 1984.

The validity of earlier attempts at squeezing global Pleistocene glacial events into the mold of the "four glaciation" Alpine model is questioned and additional criticism is made of the recent trend to expand the number of Pleistocene glaciation even further. It is pointed out that ice core data from both Greenland and Antarctica suggest that there has been a progressive global climatic cooling throughout the whole of the late Cenozoic, provoked by a reduction in size of ocean areas and an increase in the areas and heights of the continents. This cooling trend reached a maximum in the late-Quaternary (30,000 to 20,000 B.P. approximately), which was associated with a marine regression which caused the isolation and severe cooling of the Arctic Ocean. This in turn provoked a drastic cooling of the climates of the adjacent continents and initiated a limited glaciation. Ice cap formation was on much more restricted scale than has been conventionally proposed for the Pleistocene glaciations. On the other hand permafrost was very extensive on the Northern Hemisphere continents, the ratio of glacier area to permafrost area being about 1:10. The area of sea ice cover in the North Atlantic and North Pacific also expanded considerably. (Auth.)

E-36506

Palais, J.M., Kyle, P.R., Mosley-Thompson, E., Thomas, E., **Correlation of a 3,200 year old tephra in ice cores from Vostok and South Pole stations, Antarctica,** *Geophysical research letters,* Aug. 1987 14(8), p.804-807, 34 refs.

Tephra layers in two antarctic ice cores are correlated on the basis of their chemical compositions and estimated ages. It is believed the tephra was produced about 3,200 years ago from a major explosive eruption of Candlemas Island in the South Sandwich Islands. This is the first time that tephra layers have been correlated between two widely separated ice cores and demonstrates that tephra layers may serve as stratigraphic markers for correlating, and perhaps in some cases, dating antarctic ice cores. (Auth.)

E-36513

Fox, R.L., **Galactic cosmic ray produced radionuclides in antarctic meteorites and a lunar core,** San Diego, University of California, 1987, 134p., University Microfilms order No.87-12283, Ph.D. thesis, Refs. p.123-134.

Radionuclide depth effects in a meteorite, the history and pairing of antarctic meteorites and processes on the lunar surface are discussed in 6 chapters. A depth profile of Al-26, Be-10 and Mn-53 activities have been measured in 11 metal phase samples of the antarctic meteorite ALHA78084 to determine the importance of the secondary cascade in producing these nuclides in a 30 cm diameter meteorite. The results show a buildup of lower energy reaction products and a flat profile for high energy reaction products with depth. The Mn-53 activity was determined in 11 samples in 8 Allan Hills-80 antarctic meteorites and one sample from an Elephant Moraine antarctic meteorite. Mineralogic and field relation data suggest these Allan Hills meteorites to be 2 sets of paired falls. The Mn-53 results are consist-

ent with the grouping of these meteorites as paired falls excluding the meteorite ALHA80127. (Auth. mod.)

E-36517

Barrett, P.J., Elliot, D.H., Lindsey, J.F., **Beacon Supergroup (Devonian-Triassic) and Ferrar Group (Jurassic) in the Beardmore Glacier area, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 36(14), Geology of the Central Transantarctic Mountains, p.339-428, Refs. p.423-428.

The detailed stratigraphic data from the Beardmore Glacier area, presented here in tables, diagrams, cross sections and text, include the Taylor Group (Permian) with the Pagoda, Mackellar, Fairchild and Buckley formations, the Victoria Group (Triassic) with the Fremouw, Falla and Prebble formations and the Ferrar Group (Jurassic). Metamorphism in the Beacon Supergroup and the geological history of the Beardmore Glacier area from the Devonian to the Jurassic are discussed. A type section of the Kirkpatrick Basalt, Mount Falla is appended. The stratigraphic nomenclature and methods of data collection and treatment are explained.

E-36547

Bradshaw, J.D., **Terrane boundaries and terrane displacement in northern Victoria Land, Antarctica: some problems and constraints,** *American Geophysical Union. Geodynamic series,* 1987 Vol.19, Terrane accretion and orogenic belts, edited by E.C. Leitch and E. Scheibner, p.199-205, 31 refs.

DLC QE601.T47 1987

In recent years, northwest trending belts of contrasted geology in northern Victoria Land have been interpreted as terranes. Numerous tectonic hypotheses for their origin and relationship have been advanced, involving either strike slip or convergence with east and/or west dipping subduction zones. The eastern boundary of the central Bowers terrane is a zone of thrusting and tectonic mixing of probable early Ordovician age, and marked by the "Millen Schists" or Millen shear zone. The Leap Year Fault, previously regarded as the terrane boundary, is a younger high angle reverse dip slip or oblique slip fault which juxtaposes different tectonic levels. The tectonics of the western boundary are less clear. Significant thrusting has recently been demonstrated on this boundary too, but it is likely that this documents only the last major movement. Thrusting alone is inadequate to explain features including: the loss of the eastern part of the Wilson terrane, the probable loss of the western part of the Bowers terrane, the provenance of some Bowers terrane rocks, and patterns of granitoid geochemistry. A complex movement history extending over a period of 150 Ma is indicated. (Auth.)

E-36548

Gibson, G.M., **Metamorphism and deformation in the Bowers supergroup: implications for terrane accretion in northern Victoria Land, Antarctica,** *American Geophysical Union. Geodynamic series,* 1987 Vol.19, Terrane accretion and orogenic belts, edited by E.C. Leitch and E. Scheibner, p.207-219, 40 refs.

DLC QE601.T47 1987

L-S tectonites are widely developed in greenschist facies rocks along the western margin of the Bowers terrane. They are spatially and genetically related to deformation along the adjacent terrane boundary (Lanterman Fault) which is interpreted here as a major overthrust with crystalline basement rocks (Wilson terrane) emplaced over the Bowers terrane. Stretching fabrics within the tectonites plunge steeply down-dip within the regional foliation and indicate tectonic transport was primarily directed towards the northeast, at high angles to the dominant northwest trend of both the Lanterman Fault and the Bowers terrane. These relations are inconsistent with normal dip-slip or pure strike-slip displacement along the terrane boundary although reverse-slip combined with some component of right lateral transcurrent motion (i.e. transpression) could explain some of the structural data reported here. The Lanterman Fault possibly originated as a back-thrust following collision between a west-facing island arc and the Gondwana (Antarctic) margin. (Auth.)

E-36556

Colbert, E.H., **Triassic reptile *Prolacerta* in Antarctica,** *American Museum novitates,* June 24, 1987 No.2882, p.1-9, Refs. p.18-19.

The prolacertid reptile, *Prolacerta broomi,* hitherto known from the *Lystrosaurus* Zone of the Middle Beaufort beds of South Africa, is described from specimens including two skulls with jaws, other fragments with skulls and jaws, and various postcranial elements, found in the Fremouw Formation of the Transantarctic Mountains. The antarctic fossils represent individuals generally somewhat smaller than those known from South Africa, with slightly fewer teeth in the upper and lower jaws, and with other minor differences. These variations are, however, probably attributable to age differences and perhaps geographic separation rather than to any specific distinctions. A partial skeleton, including hind limbs and some caudal vertebrae of prolacertilian relationships, likewise would seem to represent an individual somewhat smaller than the South African species. The presence of *Prolacerta broomi*--in addition to a lydekkerinid amphibian *Cryobatrachus kitchingi,* the dicynodont reptiles *Lystrosaurus mccaigi,* and *Myosaurus gracilis,* the procolophonid *Procolophon trigoniceps,* and the theriodonts *Thrinaxoson liorhinus* and *Ericiolacerta parva*--corroborates the close relationships between Antarctica and South Africa and their probable connection during Early Triassic time. (Auth.)

E-36579

Kaminuma, K., **Activities of Japanese earth science research in the McMurdo Sound region in the 1986-1987 season,** *Antarctic record,* July 1987 31(2), p.155-162, In Japanese with English summary. 6 refs.

Three Japanese scientists participated in 2 cooperative projects by Japan and New Zealand during the 1986-1987 antarctic field season: CIROS (Cenozoic Investigation in the Western Ross Sea) and IMEEMS (International Mount Erebus Eruption Mechanism Study). They included gas analysis at the CIROS drilling site, and geochemical surveys in the Dry Valleys area after the drilling was finished. The following research was carried out by IMEEMS: seismic observation by means of the telemetry network, temperature measurements in the summit crater, and gravity measurements. (Auth. mod.)

E-36580

Orombelli, G., **First expedition of the Italian Antarctic Research Program: geomorphological observations** [La prima spedizione del programma nazionale di richerche in Antartide: osservazioni geomorfologiche], *Rivista geografica italiana,* June 1986 93(2), p.129-169, In Italian with English and French summaries. 18 refs.

Geomorphological investigations, carried out in Terra Nova Bay during the first expedition of the Italian Antarctic Research Program from Dec. 1985 to Feb. 1986, are reported. Three different glacial drifts are identified. The youngest, Terra Nova I, is made up of glacial and ice-contact deposits, slightly or not weathered at all, which frequently show an ice-cored moraine topography. Granitic stones are oxidized but do not show cavernous weathering, except near the coast. On the Northern Foothills TN I deposits are present up to an elevation of about 340 m. The sediments of the older glacial drift (Terra Nova II) are characterized by reddened granitic stones with cavernous weathering. They are present on the Northern Foothills up to about 600 m. The deposits of the third and oldest glacial drift

(Terra Nova III) are composed of scattered erratics, which were observed up to an altitude of 770 m. On the whole, the interpretation of Denton *et al* (1975) can be confirmed: the area of Terra Nova Bay has been reached several times by the Ross Ice Shelf with consequent obstruction, thickening and deflection toward NNE of the outlet glaciers. The small local glaciers fluctuated out of phase with the Ross Ice Shelf and the outlet glaciers. (Auth.)

E-36615

Birkenmajer, K., Luczkowska, E., **Early Miocene foraminiferal zonation, southeast Pacific basin, Antarctic,** *Polska Akademia Nauk. Bulletin. Série des sciences de la terre,* 1987 35(1), p.1-10, 18 refs.

Two foraminiferal assemblage-zones have been distinguished in Lower Miocene marine and glacio-marine sediments of the Moby Dick Group on King George I.: the *Cibicides-Cibicidoides* Assemblage-Zone (lower) and the *Cribrostomoides-Cyclammina-Globobulimina* Assemblage-Zone (upper). These zones correspond to the base of Early Miocene, ?22.5 to 20 Ma, their upper age limit established by K-Ar dating of associated volcanics. The foraminiferal assemblages consist exclusively of benthic calcareous and arenaceous forms, with *Cyclammina incisa* (Stache), *C. japonica* Asano, *Haplophragmoides carinatus* Cushman et Renz and *Uvigerinella californica gracilis* Cushman et Kleinpell being characteristic species. The Early Miocene foraminiferal assemblage-zones of the Antarctic Peninsula sector, southeast Pacific basin, do not correlate with those established for the Ross Sea sector, southwest Pacific basin. (Auth. mod.)

E-36623

Shiraishi, K., **Geological survey of the Sör Rondane Mountains in 1984/1985,** *Polar news,* July 1985 No.41, p.54-57, In Japanese.

The first comprehensive field trip to the Sör Rondane Mountains conducted by the Japanese expedition in the 1985 field season is reported with an outline of the earth science program.

E-36679

Franzmann, P.D., Deprez, P.P., Burton, H.R., Van den Hoff, J., **Limnology of Organic Lake, Antarctica, a meromictic lake that contains high concentrations of dimethyl sulfide,** *Australian journal of marine and freshwater research,* 1987 38(3), p.409-417, 27 refs.

Organic Lake in the Vestfold Hills is a shallow (7.5 m), meromictic, hypersaline lake that contains a microflora of low species diversity. The lake monimolimnion is anoxic but contains no H2S. Organic Lake has the highest concentrations of dimethyl sulfide (DMS) as yet recorded in a natural aquatic ecosystem. The greatest concentration of DMS in the lake, 97 micrograms/l, occurs just above the oxic-anoxic interface. Its presence coincides with maximal numbers of the alga *Dunaliella* sp. and maximal numbers of bacteria. Analysis of head space samples from axenic cultures indicates that *Dunaliella* sp. is not directly involved in DMS production. A bacterial strain that was isolated from Organic Lake and that produced DMS from sulfur-containing amino acids was presumptively identified as a *Halomonas* sp. (Auth.)

E-36681

Jovanovic, S., Reed, G.W., Jr., **Isotopically anomalous 196-Hg and 202-Hg in antarctic achondrites,** *Geophysical research letters,* Nov. 1987 14(11), p.1127-1130, 4 refs.

Antarctic shergottite EETA 79001 and polymict eucrite ALHA 78132 contain Hg which is anomalous in the Hg-196 or Hg-202 isotope. The anomalous fractions were extracted at 130 C during stepwise heating of neutron irradiated samples. The Hg-196/202 ratios differ by factors of 2-4 from the normal Hg ratio. This is an enormous effect. Approximately fifty other Hg fractions extracted at temperatures up to 1200 C from these and several other antarctic basaltic achondrites and from the non-antarctic fall, Shergotty, gave Hg-196/202 ratios within 20% of normal. (Auth.)

E-36690

Pardo-Casas, F., Molnar, P., **Relative motion of the Nazca (Farallon) and South American plates since Late Cretaceous time,** *Tectonics,* June 1987 6(3), p.233-248, Refs. p.246-248.

By combining reconstructions of the South American and African plates, the African and Antarctic plates, the Antarctic and Pacific plates, and the Pacific and Nazca plates, the relative positions and history of convergence of the Nazca and South American plates are calculated. These reconstructions provide quantitative evidence for a correlation of the intensity of tectonic activity in the overriding plate at subduction zones with variations in the convergence rate. (Auth. mod.)

E-36691

Johnston, A.D., **Anhydrous P-T phase relations of near-primary high-alumina basalt from the South Sandwich Islands,** *Contributions to mineralogy and petrology,* 1986 92(3), p.368-382, Refs. p.381-382.

DLC QE351.H45

Anhydrous P-T phase relations, including phase compositions and modes, are reported from 10-31 kbar for a near-primary high-alumina basalt from the South Sandwich Is. in the Scotia Arc. The water content of natural subduction-related basalt is probably <0.5 wt.% and thus, these results are relevant to the generation of primary basaltic magmas in subduction zones. The absence of olivine from the liquidus suggests that the composition studied here could not have been derived from a more mafic parent by olivine fractionation at any pressure investigated, and supports the interpretation that it is primary. The composition was extracted at 20-27 kbar after sufficiently high degrees of partial melting (about 50%) to totally consume garnet in the eclogite source. Results at 30 kbar support an origin for tonalite/trondhjemite series rocks by lower degrees of melting (15-30%), leaving both garnet and clinopyroxene in the residue. (Auth. mod.)

E-36699

Joly, Y., Frenot, Y., Vernon, P., **Environment modifications of a subantarctic peat-bog by the Wandering Albatross *(Diomedea exulans):* a preliminary study,** *Polar biology,* 1987 8(1), p.61-72, Refs. p.71-72.

On Possession I. in the Crozet archipelago, as on all the subantarctic islands, major compounds of organic nutrients are provided by avifauna. The presence of the Wandering albatross *(Diomedea exulans)* induces great perturbations in the environment at the site of the nest building activities: physical and chemical modifications of the soil (by removal of litter material for nest building, trampling and accumulated organic deposits) as well as microbiological, botanical and faunal changes. These perturbations are very localized in extent. The pedological changes have been described in terms of morphological modifications. The influence of Wandering albatrosses on the vegetation and the invertebrate fauna has been assessed and shows a decrease in the number of plant species and an increase in the number of invertebrate species. The role of some of these as indicator species is discussed. (Auth.)

E-36701

Yoshida, Y., ed, NIPR Symposium on Antarctic Geosciences, **Proceedings of the NIPR Symposium on Antarctic Geosciences, No.1,** Tokyo, National Institute of Polar Research, 1987, 203p., For individual papers see E-36702, E-36706 through E-36714, E-36716, G-36704, J-36705, L-36703 and L-36715.

The Symposium convened at the Institute in early Oct. 1986 and heard papers from forty-eight authors on topics ranging from seismic activity on Mount Erebus to rock structures in the Sör Rondane Mountains and other locations in East Antarctica, including coastal sections. This volume contains fifteen papers, abstracts of seven others, the full program for the Symposium, and an author index.

E-36702

Kaminuma, K., Amino, J., Miura, S., **Seismic activity of Mount Erebus in 1984-1985,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.1-5, 9 refs.

A program to monitor the seismic activity of the Erebus Volcano started in Dec. 1980 as an international cooperative program among Japan, the United States and New Zealand. A new volcanic episode began on Sep. 13, 1984 and continued until Dec. Seismic activity of Mount Erebus in 1985 is discussed and the following results are indicated: 1) a remarkable decrease of the background seismicity was recognized after the Sep. 1984 activity. 2) The average number of earthquakes in 1985 was 23 events per day with only one earthquake swarm in July. 3) The earthquake locations in 1985 clustered near the summit. (Auth.)

E-36706

Moriwaki, K., Matsuoka, N., Yoshida, Y., **Preliminary survey by a seismic profiling across the Gunnerus Ridge off the Riiser-Larsen Peninsula, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.41-47, 11 refs.

The following conclusion can be drawn from the interpretation of sparker sonic prospecting records obtained on the Gunnerus Ridge, off the Riiser-Larsen Peninsula. 1) The Gunnerus Ridge may be a horst composed of a continental crust, 2) a graben-like depression lies to the east of the ridge, and it seems to be connected with the inferred fault system in the central part of Lützow-Holm Bay, 3) topography or sediments on the ridge appear not to have been deformed by glaciation, suggesting that the maximum expansion of the past ice sheet might not have reached so far as 67 deg 45S on Gunnerus Ridge 725 m in present depth. (Auth.)

E-36707

Moore, J.A., Kyle, P.R., **Volcanic geology of Mount Erebus, Ross Island, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.48-65, 27 refs.

Mt. Erebus is composed predominantly of anorthoclase phonolite lava flows and associated pyroclastic rocks. At the surrounding areas of Fang Ridge, Dellbridge Is., Turks Head and Cape Barne, the lava flows and various pyroclastic deposits are predominantly intermediate in composition. Most of the lavas from Erebus and surroundings are strongly undersaturated and sodic, forming a continuous differentiation lineage consisting of basanite, Ne-hawaiite, Ne-mugearite, Ne-benmoreite and anorthoclase phonolite. These lavas are termed the Erebus lineage (EL) and are predominantly coarsely porphyritic with a similar phenocryst assemblage consisting of olivine, clinopyroxene, opaque oxides, feldspar, apatite and rare feldspathoids. EL lavas are distinctly different from the lavas of the 3 predominantly basanite volcanic centers which radially surround Mt. Erebus and must have a different petrogenesis. Very minor volumes of less undersaturated benmoreite, phonolite and trachyte occur on Mt. Erebus and must also have evolved independently of the EL. (Auth.)

E-36708

Tagai, T., **Microstructure and phase transition of calcic anorthoclase from Mount Erebus, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.66-72, 18 refs.

Monoclinic-triclinic inversion and exsolution phenomena in calcic anorthoclase were investigated by means of high temperature X-ray diffraction, X-ray microprobe analysis and analytical transmission electron microscope on natural calcic anorthoclase from Mount Erebus. Mt. Erebus anorthoclase is the most calcic one-phase anorthoclase which was twinned according to the albite- and pericline-laws in the course of monoclinic-triclinic inversion, whose temperature was 750 C. The occurrence of the one-phase anorthoclase was closely related with the eruption mechanism of Mt. Erebus. (Auth.)

E-36709

Hiroi, Y., Shiraishi, K., Motoyoshi, Y., Katsushima, T., **Progressive metamorphism of calc-silicate rocks from the Prince Olav and Sôya Coasts, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.73-97, Refs. p.94-97.

Metamorphosed calc-silicate rocks occur sporadically as small masses enclosed in other high-grade metasedimentary rocks of the Late Proterozoic Lützow-Holm Complex. Southwestward progressive metamorphism of the calc-silicate rocks is clarified which is in good agreement with the results of previous studies on the pelitic and basic-intermediate rocks. Two isograds are mapped on the basis of the continuous reaction epidote+quartz=grandite, garnet+plagioclase+Fe-oxides+H2O and the discontinuous reaction grossular+quartz=wallastonite+anorthite in the amphibolite-facies and granulite-facies terrains, respectively. The latter is the best-defined isograd among those so far drawn in various rock types of the Lützow-Holm Complex. The present study, together with the previously published ones, confirms that the regional metamorphic geotherm of the Lützow-Holm Complex based on the progressive mineral zones was of the medium-pressure type and was distinct from those of the adjacent Rayner and Yamato-Belgica Complexes. The occurrence of grossular with or without quartz in the granulite-facies terrain suggests that the vapor phase was generally poor in both H2O and CO2 during the high-grade metamorphism. (Auth. mod.)

E-36710

Kanisawa, S., Yoshida, T., Ishikawa, K., **Preliminary study on trace element geochemistry of metabasites around Syowa Station and the adjacent areas,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.98-106, 21 refs.

Trace element geochemistry of basic metamorphic rocks around Showa Station and the adjacent areas is presented. The rocks have a wide range of bulk chemical composition. As migration of some major elements such as K2O is considerable during high-grade metamorphism, the estimation of original rock series is difficult. Trace element chemistry shows migration of some incompatible elements such as K, Ba and F. The MORB and primordial mantle normalized patterns of less incompatible elements show that most of the rocks have a nature similar to MORB and that a discordant dyke, intruded after the regional metamorphism, is similar to those of within-plate basalts and/or continental alkali basalts. (Auth.)

E-36711
Motoyoshi, Y., Matsueda, H., **Corundum + quartz association in archean granulite-facies rock from Enderby Land, East Antarctica: preliminary interpretation,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.107-122, 18 refs.

Corundum occurs in direct contact with quartz in a high-temperature granulite-facies metamorphosed quartzite from the Archean Napier Complex. The quartzite is composed dominantly of bluish-gray quartz with mesoperthitic K-feldspar and spinel as subordinate constituents. Corundum is always interlocked with spinel and both minerals are in direct contact with quartz. Under the *P-T* conditions of the Napier granulites (900-1000 C, 7-10 kbar), sillimanite should be a stable Al2SiO5, and corundum cannot coexist stably with quartz. On the basis of the petrographical evidence, the corundum is inferred to be an exsolved product from spinel solid solution upon cooling, and it did not react with surrounding quartz to form Al2SiO5, probably due to the high activation energy required for the solid-solid interaction between corundum and quartz. (Auth.)

E-36712
Ishizuka, H., Kojima, H., **Preliminary report on the geology of the central part of the Sör Rondane Mountains, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.113-128, 9 refs.

The area under study is underlain by various kinds of metamorphic and plutonic rocks, of which the metamorphic rocks are tentatively divided by lithology and geologic structure into the northern and southern groups. The northern group is composed mainly of pelitic to psammitic gneisses, while in the southern group basic to intermediate gneisses predominate. Amphibolite and calc-silicate rock also occur as thin layers throughout the area. Between the northern and southern groups, a pronounced shear zone less than 1 km wide, characterized by occurrences of cataclastic or mylonitic gneisses, runs from west to east. The mineral assemblages indicate that the majority of the metamorphic rocks may belong to the amphibolite facies, but some portions reach up to the granulite facies. Among the plutonic rocks, granite and granitic pegmatite are predominant, forming large masses or dike swarms; other rocks such as diorite, dolerite, lamprophyre and ultramafic rock occur as small masses or dikes or lenses. (Auth.)

E-36713
Shiraishi, K., Kojima, S., **Basic and intermediate gneisses from the western part of the Sör Rondane Mountains, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.129-149, 24 refs.

This work reports the results of petrography and electron microprobe studies of minerals in basic to intermediate gneisses from the western part of the Sör Rondane Mountains. Mineral paragenesis and electron microprobe data indicate that the metamorphic grade in the northern part of the study area is the granulite facies, whereas that of the southern part is the upper amphibolite facies. Estimated *P-T* conditions of peak metamorphism in the northern part of the area are around 800 C and 7-8.5 kb based on various geothermo-barometries. Widespread retrograde metamorphism, caused probably by mylonitization and granite intrusion, resulted in the formation of secondary minerals in both the granulite facies and the upper amphibolite facies rocks. (Auth.)

E-36714
Asami, M., Shiraishi, K., **Kyanite from the western part of the Sör Rondane Mountains, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.150-168, 27 refs.

Kyanite, accompanied by some quartz and muscovite, occurs restrictedly in biotite aggregates (Type-B biotite) by which garnet porphyroblasts are often embayed and fringed, and thus is isolated from the matrix consisting of sillimanite, tabular biotite (Type-A biotite), K-feldspar, plagioclase, quartz, ilmenite, rutile and spinel, which contacts with no quartz. On the basis of the textural and paragenetic relations, it is inferred that this rock was recrystallized at two stages of metamorphism and that kyanite was formed in association with Type-B biotite, Fe-rich garnet (embayed edge), some quartz and muscovite through the retrograde reaction: garnet + K-feldspar + H2O = kyanite + biotite + quartz. Compositions of garnet, biotite and plagioclase in addition to the mineral assemblages of the two stages suggest that the granulite-facies metamorphism has taken place at about 830 C and 8 kb followed by the kyanite-forming retrograde event under conditions of about 560 C and at least 4.5 kb. (Auth. mod.)

E-36716
Iwata, S., **Debris-mantled rectilinear slopes in the western Sör Rondane Mountains, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.178-192, 13 refs.

In the western part of the Sör Rondane Mountains, slopes in the ice-free area are classified into the following 7 categories: cliff of free face, ice-smoothed steep slope, areal-scouring gentle topography, till-covered steep slope, debris- and/or till-covered areal-scouring gentle topography, debris-mantled rectilinear slope, and talus slope. Among them the last two categories are well developed. Debris-mantled rectilinear slopes especially occur on the north-facing slopes in gneiss rock areas. They are characterized by smooth surface, rectilinear profiles with angles of 29-37 deg, and thin debris-mantled surface. They are thought to be a kind of the Richter denudation-slope, but intensive joints occurring in the gneiss bedrock control slope configurations. (Auth.)

E-36722
Matsumoto, G., **Topics of organic substances in Antarctica,** *Polar news,* Aug. 1986 No.43, p.63-66, In Japanese.

Six topics of organic substances from the McMurdo, Showa and Vestfold oases in Antarctica were selected because of their general interest. 1) Occurrence of living organisms containing aged organic substances (C-14 content is unusually low) due to carbon recycling in the antarctic environment. 2) Lake and pond waters containing extremely high organic substances similar to urban sewage. 3) Abundances of 24-ethylcholesterol characteristic of vascular plants in lakewater and sediment. 4) Fatty acids in Ace Lake: lakewater particulate matter contains n-saturated, n-unsaturated and branched acids, while bottom sediment contains only long-chain n-saturated acids possibly derived from bacteria. 5) Presence of extremely long-chain n-saturated fatty acids extending C-40 in the dry Valley soil. 6) Chemical fossils of Gondwanaland including evidence of vascular plants.

E-36754
Singh, R.K., **Geology of Dakshin Gangotri Hill Range, Antarctica,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.181-185, 1 ref.

Geological and structural studies of the Dakshin Gangotri (Schirmacher) range were carried out from Jan. 12 to Feb. 5, 1984. The

dominant rock types are high grade quartzo-feldspathic gneisses with intercalations of metabasites. Gneisses have been broadly differentiated into pyroxene granulite, banded gneiss, garnet-biotite gneiss, augen gneiss and biotite gneiss. In addition, amphibolites, migmatites and mylonites are also prevalent. Intrusives are pegmatites of different ages and basic rocks. The dominant foliation trend is E-W with moderate dips towards south. Rocks have undergone polyphase deformation. Zones of shearing are present along the entire range. Mineral assemblages of gneisses indicate that they are products of regional metamorphism of pelitic and quartzo-feldspathic sediments under the almandine-amphibolite and granulite facies. In the central part of the range, the garnet-biotite gneiss near its contact with the augen gneiss shows disseminations of sulphides and pockets of graphite. (Auth.)

E-36755

Sengupta, S., **Geology of Schirmacher Range (Dakshin Gangotri), East Antarctica,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.187-217, 25 refs.

An area of 35 sq km in the Schirmacher Range of Queen Maud Land, East Antarctica was geologically mapped on scale 1:25,000. Six major lithological units are delineated: (a) banded gneiss, (b) alaskite, (c) garnet-biotite gneiss, (d) calc-gneiss, khondalites associated migmatites, (e) augen gneiss and (f) streaky gneiss. The rocks have suffered an early metamorphism under granulite facies conditions and an early migmatization leading to the development of charnockitic rocks. Over a large part of the area the granulite facies assemblages have suffered complete or partial diapthoresis under amphibolite facies conditions. This was contemporaneous with extensive granitization. The rocks have undergone an early deformation during the development of the charnockitic rocks and have subsequently suffered 4 generations of superposed folding. Two sets of second generation folds F2A and F2B are isoclinal and approximately coaxial in most places. In addition, there are 2 generations of open upright folds (F3 and F4) with northerly and easterly striking steep axial surfaces. Open recumbent folds (F5) have developed only locally. (Auth. mod.)

E-36756

Lai, M., **Sedimentology of the glacial sands and lake terrace sediments from Schirmacher Oasis and sea bed sediment off Princess Astrid Coast, Queen Maud Land, Antarctica,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.219-223, 6 refs.

Grain size analysis, heavy mineral studies, clay mineralogy and surface textural studies of quartz grains have been carried out on the offshore seabed sample from 215 m depth at 11 deg 53'E, 69 deg 57'S, glacial sands and lake terrace sediments from the Schirmacher Hills region. Grain size of the sea-bed sediments varies from coarse sand to clay size. Probability curve corresponds to marine shelf environment. Glacial sediment shows grain size variation from coarse sand to clay grade. Hornblende, zircon, garnet, tourmaline, kyanite, epidote, staurolite and hypersthene form the heavy mineral suite. Illite with subordinate chlorite are main clay minerals in lake terrace and offshore sediment. Plagioclase and phillipsite are also noted. Study of quartz grain surface textures by SEM shows conchoidal fracture and V-shaped depressions. A probable glacial origin of the sands is inferred. (Auth.)

E-36757

Ravindra Kumar, G.R., **Note on the P-T conditions of metamorphism of Schirmacher Range, East Antarctica,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.225-230, 14 refs.

Mineral chemical data of selected rock types of Schirmacher range, East Antarctica, are presented. Some of these rocks have strong petrological comparisons to south Indian leptynites and khondalites. Temperature estimate based on the Fe-Mg calibrations of coexisting garnet-biotite mineral pairs suggested that metamorphic temperatures varied from 550-750 C. Geo-barometer calibration of garsil-plag-qtz yielded an estimate of 5.31k bar at 600 C for khondalites. (Auth.)

E-36763

Ugolini, F.C., **Processes and rates of weathering in cold and polar desert environments,** Rates of chemical weathering of rocks and minerals. Edited by S.M. Colman and D.P. Dethier, Orlando, FL, Academic Press, Inc., 1986, p.193-235, Refs. p.227-235.

Adverse climatic conditions prevailing in the polar and cold deserts are unfavorable for intense weathering, especially chemical weathering. Paucity of water in the liquid phase hampers processes for which water is essential. Low temperatures also affect the rates of chemical reactions. In the polar desert and in the ice-free areas of Antarctica cavernous weathering once attributed to wind abrasion and frost shattering is now accepted as also due, at least in part, to salt weathering. Since in polar and cold desert regions biological activity is low, chemical weathering is considerably attenuated. In these regions weathering occurs in neutral conditions and in a high-ionic-strength liquid phase. In Antarctica a few quantitative studies have documented some time-dependent properties of soils. This is the case for weathering sequences examined in the ice-free areas of southern Victoria Land. In these studies it has been demonstrated that clay and free iron hydroxides increase with age. It has also been demonstrated that authigenic mica developed from feldspar could form in about 4 m.y. (Auth. mod.)

E-36770

Kaiser, G., Loos, G., **Ar-40/Ar-39 age of a basic rock from East Antarctica** [Ar-40/Ar-39-Alter eines Basits der Ostantarktis], *Journal of radioanalytical and nuclear chemistry,* July 1984 83(1), p.129-133, In German with English summary. 7 refs.

The Ar-40/Ar-39 technique is an analytical variation of the K-Ar dating method. A known fraction of the K-39 in a sample is converted to Ar-39 by irradiation with fast neutrons. In an incremental heating experiment, the argon is released from the sample fractionally by stepwise heating. The result is a series of apparent ages. Ar-40/Ar-39 age spectrum was determined for a sample from the Vestfold Hills. The minimum of the saddle-shaped age spectrum gives 1.0 billion years. (Auth.)

E-36774

Carlquist, S., **Pliocene *Nothofagus* wood from the Transantarctic Mountains,** *Aliso,* 1987 11(4), p.571-583, 19 refs.

Subfossil wood fragments up to 10 cm long and 2 cm in diameter recovered from a locality thought, on the basis of diatom deposits, to be Upper Pliocene-Lower Pleistocene (Oliver Bluffs, Sirius Formation, in the Transantarctic Mountains) were sectioned for identification. All of the fragments appear to represent one species. Features of growth rings (ring porous, vessels mostly solitary in earlywood), rays (predominantly uniseriate, both erect and procumbent cells common), vessel perforation plates (simple, at least in earlywood), lateral wall pitting of vessels (predominantly transitional in earlywood, scalariform in latewood) and tyloses (present) permit one to identify the Oliver Bluffs woods as a *Nothofagus*. The nature of the Oliver Bluffs woods is discussed with relation to reports of *Nothofagus* wood from the Falkland Is. and *Nothofagus* pollen from Antarctica, and the implications of this polar flora are considered. (Auth. mod.)

E-36775
Weber, W., **Useful mineral deposits and raw materials occurrences in Antarctica** [Nutzbare Mineralisationen und Rohstoffvorkommen in der Antarktis], *Freiberger Forschungshefte. Reihe C,* 1987 No. C 409, 54p., In German with summaries in English and Russian.

An overview is given about the occurrences of metallic and non-metallic-mineral raw materials and coals in Antarctica. Additionally, speculations are made on geothermal energy and hydrocarbons. A short description of the palaeotectonic development of the continent allows further minerogenic/metallogenic conclusions. All data are shown in maps and listed in tables. The many references included suggest areas of further investigations. (Auth.)

E-36776
Stanek, K.P., **Report on the geology of the southern Lassiter Coast and the eastern Orville Coast (Antarctic Peninsula)** [Beitrag zur Geologie der südlichen Lassiter Coast und der östlichen Orville Coast (Antarktische Halbinsel)], *Freiberger Forschungshefte. Reihe C,* 1987 No. C 412, p.5-50, In German with English and Russian summaries. 59 refs.

The paper contains some results of geological investigations made during the 27th to 29th Soviet Antarctic Expeditions. Sedimentary and volcanogenic Jurassic formations overlie a probably pre-Jurassic basement. The formations are part of the back arc environment of the southern Antarctic Peninsula. In Lower Cretaceous time these formations are folded. Many postkinematical plutons and dikes intruded the fold structures. In the Tertiary period faulting and thrusting predominate. (Auth.)

E-36777
Weber, W., Rank, K., **Geology of the Hutton Mountains and the Guettard Range (Palmer Land, Antarctic Peninsula)** [Beitrag zur Geologie der Hutton Mountains und der Guettard Range (Palmer Land, Antarktische Halbinsel)], *Freiberger Forschungshefte. Reihe C,* 1987 No. C 412, p.51-68, In German with English and Russian summaries. 11 refs.

During austral summer 1983/84 a team of 5 Soviet geologists and geophysicists and one geologist from GDR worked one month investigating the Hutton Mountains region. The article gives a summary of the geologic development of Palmer Land and a preliminary report on the results of field work and geochemical analyses. During the Jurassic and Cretaceous, eastern Palmer Land was part of a back arc terrain east of a magmatic arc in the center of the Antarctic Peninsula. In this area fossiliferous slates and volcanites of the Latady Formation were deposited. During the Cretaceous this formation became intensely deformed. Folds are partly isoclinal, mostly asymmetric and E-vergent. The fold axis and 1st cleavage are striking NNE-SSW. Latady Formation is intruded by upper Cretaceous calc-alkaline post-deformation plutonites. Dikes of intermediate to felsic rocks are partly older, partly younger than the intrusives. Plutonism is connected with oxidic and sulfidic Fe- and Cu-mineralizations. (Auth.)

E-36778
Weber, W., **Geotectonic and minerogenic epochs and provinces of Antarctica** [Geotektonische sowie minerogenetische Epochen und Einheiten Antarktikas], *Freiberger Forschungshefte. Reihe C,* 1987 No. C 418, 75p., In German with English and Russian summaries. 325 refs.

A survey is given of the geotectonic and minerogenic development of the south polar continent during 4 billion years on the basis of current geoscientific knowledge. Minerogenic (or raw material) regions and promising areas for future prognostic work are shown on the basis of comparisons with other southern continents, general regularities of minerogenic evolution and evaluations of occurrences of ores. The article includes 32 maps and diagrams and 4 multipage tables. (Auth.)

E-36780
Crame, J.A., **Polar origins of marine invertebrate faunas,** *Palaios,* Dec. 1986 1(6), p.616-617, 20 refs.

The pervasive view among many paleontologists, that the tropics have for a long time acted as the major evolutionary and dispersal center in both the marine and terrestrial realm, is challenged on the basis of the discovery of a rich marine invertebrate fauna in the Early Tertiary La Meseta Formation of Seymour I. The conclusions arrived at from the analysis of this fauna are discussed, and various theories on which to base the hypothesis that Antarctica could have been a holding tank for new taxa until they could spread to lower latitudes are briefly reviewed.

E-36793
Yanai, K., comp, Kojima, H., comp, **Photographic catalog of the antarctic meteorites,** Tokyo, National Institute of Polar Research, 1987, 298p., 1 ref.

This photographic catalog of selected antarctic meteorites has been specifically compiled for the purpose of recording characteristic features of 327 specimens, with a total of 507 color photographs which include 322 whole specimens, 2 enlarged views of their cut surfaces and 183 thin sections. All of the specimens in the catalog belong to the antarctic meteorite collection of the National Institute of Polar Research, and have been collected between 1969 and 1987. The catalog also comprises 150 diagrams showing the chemical compositions of olivines, pyroxenes and plagioclases in stony-irons, achondrites and some unique specimens. The volume is completed with a list of 6435 specimens of antarctic meteorites in the NIPR collections, giving their original weights, types and chemical data for classification.

E-36796
Gee, C.T., **Revision of the early Cretaceous flora from Hope Bay, Antarctica,** Austin, University of Texas, 1987, 155p., University Microfilms order No.87-17417, Ph.D. thesis. Refs. p.146-154.

The Early Cretaceous (Berriasian) Hope Bay flora is one of the most diverse assemblages from the Mesozoic of Antarctica. Collected in 1902 by the Swedish Antarctic Expedition of 1901-1903 from Hope Bay at the northern tip of the Antarctic Peninsula, and described in 1913 by T.G. Halle, it was in serious need of revision. This revision has reduced the number of taxa from 61 to 42 species. Newly erected species are *Otozamites rowleyi, Kachchhia schopfii, Ticoa jeffersonii,* and *Araucaria antarctica.* New combinations are *Todites grahamii* and *Thinnfeldia salicifolia.* The genera *Kachchhia, Ticoa,* and *Weltrichia* are new occurrences at Hope Bay. Represented in the flora are members of the Hepatophyta, Arthrophyta, Pteridophyta, Pteridospermophyta, Cycadophyta, Cycadeoidophyta, and Coniferophyta. Not surprisingly, when compared with other Gondwana floras, the Hope Bay flora shows the greatest similarity with other antarctic floras. There is also a close affinity with the floras of South America and New Zealand. Taxonomic similarity between these floras is best explained by paleogeographic proximity. (Auth. mod.)

E-36798
Mackinnon, D.I., **Influence of Australasian-Antarctic plate tectonics and palaeoceanographic development on the morphology and inferred life habits of New Zealand Neogene brachiopods,** *Palaeogeography, palaeoclimatology, palaeoecology,* Feb. 1987 58(1/2), p.63-73, Refs. p.72-73.

Significant changes in the taxonomic composition of New Zealand brachiopod faunas occurred in the Late Oligocene following

continuing divergent plate movement between Australia and Antarctica and the initiation of the present southern ocean circulation pattern. The sudden appearance and the rapid radiation of the various unrelated stocks at the end of the Paleogene may have occurred as a result of new, regionally intense circulation patterns associated with the establishment of antarctic glaciation. During the Late Miocene and Pliocene there was a progressive drop in seawater temperature. A combination of rapid uplift and subsidence, reflecting a change from predominantly transcurrent to convergent plate movement along the length of the Alpine Fault in New Zealand, led to a drastic reduction in the areal extent of the kinds of shallow marine shelf environments earlier colonized by brachiopods. (Auth. mod.)

E-36799

Robert, C., **Clay mineral associations and structural evolution of the South Atlantic: Jurassic to Eocene,** *Palaeogeography, palaeoclimatology, palaeoecology,* Feb. 1987 58(1/2), p.87-108, Refs. p.106-108.

Clay minerals have been used to reconstruct the geological history of the South Atlantic. Six mineralogical stages have been recognized from the Middle Jurassic to the Eocene, including, prior to the Oxfordian, illite, irregular mixed-layers and kaolinite, which marked a period of tectonic extension between Africa and Antarctica. From the Early Turonian to the Early Campanian, and after the Early Paleocene, smectites, palygorskite and sepiolite characterized the widespread subsidence in the South Atlantic. (Auth. mod.)

E-36837

Pirrie, D., Sykes, M.A., **Regional significance of proglacial delta-front, reworked tuffs, James Ross Island area,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.1-12, 19 refs.

Distinctive tuffs from Hidden Lake, James Ross Island and northeast Tail Island can be subdivided into 5 lithofacies, which mainly represent rapid deposition out of suspension from sediment-laden currents. Primary sedimentary structures include planar lamination and climbing-ripple lamination. Synsedimentary slumping and the formation of dish and pillar structures represents pore fluid overpressure, as a result of rapid deposition. The Tail Island tuffs are composed almost entirely of cuspate glass shards which have subsequently altered to palagonite, with rare crystals of plagioclase and olivine and sparse lithic fragments. The tuffs are envisaged as being derived from a nearby pyroclastic source. The Hidden Lake tuffs are less shardic with an increase in the proportions of non-cuspate, blocky shards, lithic and crystal fragments indicating derivation from a mixed hyaloclastic and pyroclastic source area. Olivine/plagioclase crystal ratios from the two localities studied reflect the variations in the proportions of olivine-phyric and plagioclase-phyric lavas present at the two localities. (Auth. mod.)

E-36838

Dettmann, M.E., Thomson, M.R.A., **Cretaceous palynomorphs from the James Ross Island area, Antarctica—a pilot study,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.13-59, Refs. p.55-59.

Faunas of ammonites and bivalves, aquatic floras of dinocysts and prasinophycean/chlorophycean algae, and land-plant florules of spores, pollen, and fugal palynomorphs are reported. Mid- to Late Cretaceous dinocyst assemblages of the Antarctic Peninsula confirm wide distribution, in southern high latitude oceanic regions, of the successive *Muderongia, Heterosphaeridium,* and *Isabelidinium* floras (recognized originally in Australia). Contemporaneous land-plant floras comprised a succession of rainforest communities having affiliations with vegetation fringing the southern Atlantic Ocean and in Australasia. Mid-Cretaceous araucarean/podocarp rainforests were modified during the Campanian by the introduction of *Nothofagus.* Evidence is advanced for step-wise migration of certain cryptogam and angiosperm elements within southern Gondwana. The palynofloras comprise 62 cryptogam-spore, 54 pollen, 80 dinocyst, and 9 prasinophycean/chlorophycean taxa. (Auth. mod.)

E-36839

Tranter, T.H., **Structural history of the LeMay Group of central Alexander Island, Antarctic Peninsula,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.61-80, 48 refs.

In central Alexander I. the first deformational episode (D1) is characterized by the widespread development of layer-parallel fabrics, stratal disruption in poorly lithified sediments, and accretion-related thrusting in a variety of rock types. The variation in D1 can be interpreted in terms of the differing positions of lithological units within the developing complex. D2 deformation cannot be correlated precisely throughout the area, and comprises two distinct structural styles. A variety of processes contributes to the D2 episode and the general structure of the region. The LeMay Group of central Alexander I. is interpreted as a mixture of arc-derived clastic units and allochthonous oceanic units accreted to the active margin. Changes in structural style are related to varying accretionary processes in different parts of the complex. (Auth. mod.)

E-36840

Pudsey, C.J., Murray, J.W., Ciesielski, P.F., **Late Pliocene to Quaternary sedimentation on the South Orkney shelf,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.81-97, 20 refs.

Seven gravity cores from 650 m to 1540 m water depth on the South Orkney shelf contain diatoms ranging in age from late Pliocene to late Pleistocene/Recent. The sediments are diatomaceous muddy sands with abundant ice-rafted debris. Modal sand size is coarser at more exposed sites, reflecting action by bottom currents. The assemblages of planktonic and benthic foraminifera in the core tops differ from those further downcore, and indicate a more corrosive water mass today than in the past. Grain-size and the composition of the terrigenous fraction are rather uniform downcore, indicating that source areas and transport processes (bottom currents and ice-rafting) have not varied greatly during the time represented. The sedimentary record is however incomplete, with most of the Pleistocene missing in at least one core. (Auth.)

E-36844

Storey, B.C., Wever, H.E., Rowley, P.D., Ford, A.B., **Report on antarctic fieldwork; the geology of the central Black Coast, eastern Palmer Land,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.145-155, 12 refs.

The geology of the previously unmapped, central Black Coast has similarities with both the northern and southern regions. It represents a transition from a northern region dominated by sheared plutonic and volcanic rocks with subordinate deformed sedimentary rocks and post-tectonic Cretaceous granitoid plutons, to one dominated by deformed back-arc basin sedimentary rocks, subordinate volcanic-arc rocks and large post-tectonic granitic plutons. A new mappable unit of pre-tectonic amygdaloidal basalts, a major episode of shear zone deformation and a new sequence of metasedimentary rocks, have been recognized. The field work may provide valuable constraints on the early arc magmatism and the development stages of the Jurassic back-arc basin on the east coast of Palmer Land. (Auth.)

E-36859

Cox, S.C., **Origin of Olympus granite-gneiss,** *New Zealand antarctic record,* 1987 8(1), p.42-47, 12 refs.

On the south side of the Olympus Range, Wright Valley, two genetically distinct foliated granitic rocks (flow-foliated granite and

migmititic granite-gneiss) border Koettlitz group rocks. Collectively, these granitic rocks were defined and mapped as Olympus granite-gneiss by McKelvey and Webb (1962). The defined body of rock's two components, some dubious correlation of other gneisses with Olympus granite-gneiss, and the complexity of the geology in general, has resulted in confusion as to Olympus granite-gneiss' origin. The name Olympus granite-gneiss should be discarded. In future, the use of lithologic and morphologic criteria, with emphasis on foliation, would clarify the classification of gneisses in southern Victoria Land. (Auth.)

E-36860

Allibone, A., **Koettlitz group metasediments and orthogneisses from the mid Taylor Valley and Ferrar Glacier areas,** *New Zealand antarctic record,* 1987 8(1), p.48-60, 20 refs.

Six weeks were spent in the Taylor Valley and Ferrar Glacier areas studying various aspects of the Koettlitz Group and its associated intercalated orthogneisses. The origin and development of the wide variety of migmatites and their relationship to the structures within the Koettlitz Group were of particular interest. Prior to this, no detailed study of these migmatites had been attempted. On the basis of field relations a structural and anatectic history has been derived. The migmatite study was combined with a petrologic study of the wide variety of meta-sedimentary lithologies to compare the Koettlitz Group with other more extensively studied suites of similar metamorphic rocks. The discovery of garnetiferous and pelitic rocks in the mid Taylor VAlley and Darkowski Glacier localities has made possible a much closer and more definitive comparison of Koettlitz group assemblages with those of other metamorphic terranes. (Auth.)

E-36861

Smillie, R.W., **Petrological evolution of basement granitoids, southern Victoria Land: "Where there was once one, there are now many",** *New Zealand antarctic record,* 1987 8(1), p.61-71, 43 refs.

This project is chiefly concerned with elucidating the evolution of basement granitoids observed in the Taylor Valley and Ferrar Glacier regions during the 1986-87 austral season. Several workers have studied these and other granitoids in the Dry Valleys, yet a detailed petrographical and chemical study of these rocks remains to be done. This is mainly due to the more regional scale of previous studies, with a stronger emphasis on 'reconnaissance' mapping of different lithologies rather than examining them in detail. More recent field work has shown that the subdivision of the basement granitoids into syntectonic Larsen Granodiorite and post-tectonic Irizar Granite is an oversimplification of a more complex intrusive sequence. Six granitoids were mapped in the study area: a medium grain-sized tonalite, a potassium feldspar-rich megacrystic granite, a medium grain-sized granodiorite, a porphyritic potassium-feldspar granite, a fine to medium grain-sized equigranular granite, a fine-grained 'grey granite' and fine-grained leucocratic granite. These rocks have been collectively mapped as Larsen Granodiorite and Irizar Granite and are described in text and photographs. (Auth. mod.)

E-36862

Graham, I.J., Palmer, K., **New precise Rb-Sr mineral and whole-rock dates for I-type granitoids from Granite Harbour, south Victoria Land, Antarctica,** *New Zealand antarctic record,* 1987 8(1), p.72-80, 15 refs.

Three mineral and one whole-rock Rb-Sr isochrons are presented for granitoids of the Granite Harbor Intrusive suite from Granite Harbor, south Victoria Land, Antarctica. The mineral dates agree with 6 whole-rocks collected from two plutons some 18 km apart (Lion Island and Avalanche Bay), and are therefore interpreted as the time of cooling following intrusion. The close agreement between mineral and whole-rock dates indicates that cooling/uplift was relatively rapid. Initial Sr-87/Sr-86 is lower than previously reported for Granite Harbor Intrusives from this region and is consistent with the I-type mineralogy and chemistry of the granitoids. (Auth.)

E-36869

Wilson, M.A., Goh, K.M., Collin, P.J., Greenfield, L.G., **Origins of humus variation,** *Organic geochemistry,* 1986 9(5), p.225-231, Refs. p.230-231.

Humus samples derived from peat, moss or ornithogenic sources in Antarctica have been examined by C-13 nuclear magnetic resonance techniques. The C-13 spectra show that the humus has undergone very little chemical modification. A fulvic acid fraction from a moss derived soil is almost entirely alpha- and beta-glucose. The results also show that lignin is not a necessary precursor for aromatic components in soils. It is suggested that the aromaticity and carbohydrate content of certain soils is governed by the low temperature which influences the degree of humification. (Auth.)

E-36892

Ryder, G., **Moon,** *Reviews in geophysics,* Mar. 1987 25(2), p.277-284, Refs. p.282-284.

In this review, prominence is given to 2 major developments which have taken place in the period 1983-6: interest in, and a possible consensus on, the origin of the Moon; and the recognition and study of meteorites from the Moon. Among these, 4 which have landed on Antarctica are described: Allan Hills 81005, which was the first meteorite to be positively identified with a specific parent body and 3 from the Japanese Yamato collection: Y-91197, Y-82192, and Y-82193. All 4 lunar meteorites are rather small: 31, 52, 37, and 27 g respectively. Their significance far outweighs their mass, for they provide new information about the character and evolution of the Moon, and prove that rocks can be ejected from planetary bodies up to at least lunar size without melting or even appreciable shocking.

E-36933

Kurinin, R.G., Golynskiĭ, A.V., Grikurov, G.E., Zatsepin, E.N., **Geophysical study of alkaline-ultramafic bodies in the Beaver Lake area, East Antarctica** [Rezul'taty geofizicheskogo izucheniia proiavleniĭ shchelochno-ul'traosnovnogo magmatizma v raĭone ozera Biver (Vostochnaia Antarktida)], *Antarktika; doklady komissii,* 1987 No.26, p.53-61, In Russian. 12 refs.

Diatremic-dike bodies of alkaline-ultramafic rocks are clearly discernible in the magnetic field, although the amplitude of magnetic anomaly on different bodies can vary by an order of one or two. In the Beaver Lake area, the detection of unsurfaced diatremic-dike bodies was most effectively achieved by the gravi-magnetic method. Localization of alkaline-ultramafic bodies is controlled by points of intersection of regional paleorifts and rift-zones with transversal tectonic ruptures.

E-36934

Kurinin, R.G., Aleshkova, N.D., **Bedrock relief of Enderby Land, Mac. Robertson Land and Princess Elizabeth Land, East Antarctica** [Korennoĭ rel'ef Zemli Enderbi, Zemli Mak-Robertsona i Zemli Printsessy Elizavety v Vostochnoĭ Antarktide], *Antarktika; doklady komissii,* 1987 No.26, p.62-65, In Russian. 4 refs.

A map of the subglacial topography of Enderby Land, Mac. Robertson Land, Lambert Glacier and adjacent areas, compiled with data from seismic and radio-echo soundings carried out between 1968 and 1977, is presented and discussed. The basic morphology of the area is described, with the suggestion that it had been determined by the nature of the regional tectonic developments. The rising of sub-

latitudinal and sub-meridional, deeply depressed, basins of Enderby Land is linked to the ice cover formation, which resulted in crustal cracking of the continental margins. The discussion of riftogenetic processes includes the Lambert Glacier region as an example.

E-36936

Traube, V.V., **Main features of the tectonic structure of the Ross Sea megabasin** [Osnovnye cherty tektonicheskogo stroeniia megabasseĭna moria Rossa], *Antarktika; doklady komissii,* 1987 No.26, p.72-82, In Russian. 27 refs.

Based on an analysis of geological and geophysical data found in foreign literature, and on the author's own observations, a structural and tectonic scheme of the Ross Sea sedimentary basin and its surrounding mountains is constructed. The map is presented and discussed.

E-36937

Ivanov, V.L., Kraev, A.G., **Possible ways of exploration and exploitation of hydrocarbon resources in the Antarctic** [Vozmozhnye puti izucheniia i osvoeniia neftegazovykh resursov Antarktiki], *Antarktika; doklady komissii,* 1987 No.26, p.83-94, In Russian. 14 refs.

Maps of sedimentary basins in Antarctica, and a table estimating their hydrocarbon resources, are presented. Also discussed and shown on maps are portions of Antarctica classified according to the ice cover type: open shelves, regions under the shelves, and regions under the continental ice sheet. Morphological and structural information on potential hydrocarbon basins leads to the conclusion that the Ross and Weddell basins offer the best prospects.

E-36943

Shmideberg, N.A., **Hydrochemical data for paleohydrological reconstruction of deep nondraining lakes of East Antarctica** [Ispol'zovanie gidrokhimicheskikh dannykh dlia vosstanovleniia paleogidrologii glubokovodnykh besstochnykh ozer Vostochnoĭ Antarktidy], *Antarktika; doklady komissii,* 1987 No.26, p.148-156, In Russian. 10 refs.

The determination of past hydrological conditions in Dry Valley lakes without drainage, based on hydrochemical data from current conditions in lakes and waterways, is discussed. A method is proposed to compare the accretion rate of bromine (Br) in contemporary lake waters with Br accretion rate in sea water, which would disclose additional Br sources or possible ways of its losses.

E-36951

Gamble, J.A., Kyle, P.R., **Origins of glass and amphibole in spinel-wehrlite xenoliths from Foster Crater, McMurdo volcanic group, Antarctica,** *Journal of petrology,* Oct. 1987 28(5), p.755-779, Refs. p.777-779.

Vesicular interstitial glass in four kaersutite-bearing spinel-wehrlite xenoliths from Foster crater has reacted with host olivine and clinopyroxene and contains a microphenocryst assemblage of spinel, olivine, and clinopyroxene together with later rhonite and plagioclase. Electron microprobe analyses of the glasses have low SiO2 and MgO contents and high contents of alkalis. Olivine microphenocryst cores in glass are magnesian and must have precipitated from more primitive liquids; rim compositions are Fe-rich and in equilibrium with glass. Continuous core to rim zonation in the olivine microphenocrysts indicate that glass compositions have fractionated due to crystallization of the enclosed mineral assemblage. Mass balance addition calculations, using the compositions and proportions of the crystals in glass, produce melt compositions appropriate to primary alkali basaltic magmas. Glasses show light rare earth element enrichment relative to chondrites and, together with Ba, Rb, Cr, Hf, Ta, and Th are similar to many of the basanites from the Erebus Volcanic Province. (Auth. mod.)

E-36952

Nedell, S.S., Andersen, T.W., Squires, S.W., Love, F.G., **Sedimentation in ice-covered Lake Hoare, Antarctica,** *Sedimentology,* Dec. 1987 34(6), p.1093-1106, 20 refs.

The sedimentation mechanisms that occur in ice-covered Lake Hoare are examined to determine how sediment enters the lake, and how the sedimentation pattern affects blue-algal growth at the lake bottom. The 3 m-thick ice cover contains pebbly sand as much as 2 m below the surface. Sediment with similar texture and mineralogy is found at the lake bottom. This evidence, together with the lack of sediment in the inflowing stream and the markedly different texture of sediment from the other terrains around the lake suggest that most of the sediment at the lake bottom comes in through the ice cover. Sand grains intermittently migrate through porous ice on the surface, water-filled vertical gas-channels penetrating two-thirds of the ice cover, and possibly through cracks in the ice that act as conduits. The algae at the lake bottom are able to survive in part because sediment that comes through the ice cover does not obliterate them. (Auth.)

E-36953

Hiller, N., **Identity of *Chonetes falklandicus* (Brachiopoda, Devonian),** *Journal of paleontology,* Nov. 1987 61(6), p.1148-1155, 19 refs.

Examination of collections from the Falkland Islands and South Africa shows that *Chonetes falklandicus* Morris and Sharpe, 1846, is a true *Chonetes* and is probably conspecific with *Chonetes (Pleurochonetes) lauriata* Isaacson, 1977, from Bolivia. *Notiochonetes skottsbergi* (Clarke, 1913) is quite different from *C. falklandicus* but is often associated with it in Malvinokaffric Realm Lower Devonian deposits. (Auth.)

E-36954

Feldmann, R.M., Tshudy, D., **Ultrastructure in cuticle from *Hoploparia stokesi* (Decapoda: Nephropidae) from the Lopez de Bertodano Formation (Late Cretaceous-Paleocene) of Seymour Island, Antarctica,** *Journal of paleontology,* Nov. 1987 61(6), p.1194-1203, 21 refs.

Examination, utilizing scanning electron microscopy, of 58 specimens of *Hoploparia stokesi* (Weller) from the Maastrichtian portion of hte Lopez de Bertodano Formation, Seymour I., leads to the conclusion that cuticular ultrastructure may be used to distinguish molted from decreased remains of nephropid lobsters. Molted cuticle is characterized by deterioration, or loss, of lamination in the inner endocuticle whereas cuticle, during the intermolt phase, exhibits lamination throughout the endocuticle as well as the exocuticle. Diagenetic effects may obscure lamination throughout the cuticle. These observations confirm that Salter's position is typical of molted remains in fossils. Furthermore, partial remains of *H. stokesi* generally are molts. Preservational quality of molted remains tends to be better than that of corpses. (Auth.)

E-36955

Case, J.A., Woodburne, M.O., Chaney, D.S., **Gigantic phororhacoid(?) bird from Antarctica,** *Journal of paleontology,* Nov. 1987 61(6), p.1280-1284, 27 refs.

The anterior portion of a fossilized beak from a gigantic, perhaps flightless, predaceous bird was recovered recently from late Eocene (ca. 40 million years old) deposits on Seymour I. The specimen was collected during the 1986-1987 field season from the medial to late Eocene La Meseta Formation; it predates the oldest geologic occurrence described from South America. The presence of a large flight-

less bird in early Tertiary strata of Antarctica (King George I.) strengthens the contention that the land connection between South America and Antarctica in the Eocene (possibly as early as the latest Cretaceous) was a continuous body of land rather than a series of islands.

E-36962

Lukanina, I.V., **Radiolaria from neogene sediments in the antarctic zone of the Pacific Ocean** [Radiolarii iz neogenovykh otlozheniĭ v antarkticheskoĭ zone Tikhogo okeana], Stratigrafiia i fatsii osadochnogo chekhla okeanov (Stratigraphy and facies of oceanic sedimentary layers). Edited by V.A. Basov and D.K. Patrunov, Leningrad, Sevmorgeologiia, 1985, p.77-82, In Russian. 8 refs.

Investigations of radiolaria, carried out by several authors in the southwest Pacific Ocean, are reviewed. A biostratigraphic scheme for Pleistocene-Oligocene deposits is presented and discussed.

E-36970

Bradshaw, M.A., **Additional field interpretation of the Jurassic sequence at Carapace Nunatak and Coombs Hills, south Victoria Land, Antarctica,** *New Zealand journal of geology and geophysics,* 1987 30(1), p.37-49, 28 refs.

The Jurassic volcanic sequence at Carapace Nunatak and Coombs Hills, south Victoria Land, records an initial phase of explosive volcanicity, in part acidic, that was followed by quieter flood basalt extrusion, a pattern repeated elsewhere in the Transantarctic Mountains. The explosive phase produced poorly sorted volcanogenic material (Mawson Formation) at Coombs Hills. The succeeding flood basalts are known as the Kirkpatrick Basalt Group. Features of the Mawson Formation diamicties do not support the laharic origin proposed by earlier workers. At Carapace Nunatak a hyaloclastic breccia mass developed after eruption of lava directly into lakewater. Basalt 'pillows" intrude from a sheet lava base into both breccia and disturbed beds of fine-grained fossiliferous lake sediment. A comparable sequence does not occur at Coombs Hills where thick basalt flows overlie Mawson Formation, although rafts of fine sediment in the base of the fourth flow suggest lake formation during pauses in eruption. Thin pillow lavas and sedimentary interbeds in the predominantly subaerial Kirkpatrick Basalt sequence indicate that subsidence kept pace with lava accumulation to maintain a persistent regional depression. This is also indicated by other Jurassic sequences in the Transantarctic Mountains. (Auth. mod.)

E-36971

Adams, C.J., **Geochronology of granite terranes in the Ford Ranges, Marie Byrd Land, West Antarctica,** *New Zealand journal of geology and geophysics,* 1987 39(1), p.51-72, Refs. p.70-72.

Rb-Sr whole-rock isochron and K-Ar mineral ages are presented for Ford Granodiorite (Devonian) and Byrd Coast Granite (Jurassic-Cretaceous) in the Ford Ranges, Marie Byrd Land, West Antarctica. K-Ar mineral ages of the Ford Granodiorite are 324-375 Ma, concentrating at 355-375 Ma, and those <360 Ma are mainly in the central Denfeld Mountains. Rb-Sr whole-rock isochron ages of plutons in Denfeld and Sarnoff Mountains are 355-375 Ma (Late Devonian) for earliest adamellite granodiorites and 340-360 Ma (Early Carboniferous) for younger biotite granodiorite and muscovite granite. Rb-Sr whole-rock isochron ages of Byrd Coast Granite (Mesozoic) indicate two plutonic phases; leucogranites 140-150 Ma (Late Jurassic-Early Cretaceous) in the Clark Mountains and at Mt. Corey, with associated minor intrusives at Breeding and Stanford Nunataks; widespread granodiorites, 110-115 Ma (mid Cretaceous), in the Allegheny and Sarnoff Mountains. Correlatives in the Fosdick Mountains are 95-100 Ma old. The older Jurassic plutonics are confined to the eastern margin of the Ford Ranges but mid-Cretaceous granites are part of a widespread belt along the Pacific coast of West Antarctica. Strontium initial ratios of Ford Granodiorite and Byrd Coast Granite are mostly 0.704-0.706, characteristic of I-type calcalkaline granite-granodiorite plutonism. (Auth. mod.)

E-36972

Findlay, R.H., Adams, C.J., **Geochronological studies of the Swanson Formation of Marie Byrd Land, West Antarctica, and correlation with northern Victoria Land, East Antarctica, and South Island, New Zealand: comment,** *New Zealand journal of geology and geophysics,* 1987 39(1), p.99-101, 15 refs. Includes reply by C.J. Adams.

This is a comment on an article by C.J. Adams (1986), questioning the data interpretation methods used in establishing the geochronology of the pre-Devonian Southwest Pacific margin of Gondwana. In the reply, stating that while it may be possible to derive several age interpretations from similar rock types and data sets, a metamorphic age and a sedimentation age are re-defined. For the article commented on, see E-35288.

E-36980

Tingey, R.J., comp, **SCAR bulletin No.88, January 1988,** *Polar record,* Jan. 1988 24(148), p.79-84.

Included are brief reports on antarctic Cenozoic paleoenvironments, antarctic crustal structure, satellite imagery, and logistics. The first two are summaries of workshops held in San Diego in June 1986; the satellite imagery report was also part of the Working Group on Geology and Solid Earth Geophysics meeting in San Diego. The logistics WG met in Colorado in June of 1987. The report summarizes their discussions on air operations safety and waste disposal among other topics.

E-36988

Barsch, D., Mäusbacher, R., **Contributions to the history of glaciation and the development of relief of the South Shetland Is.** [Beiträge zur Vergletscherungsgeschichte und zur Reliefentwicklung der Südshetland Inseln], *Zeitschrift für Geomorphologie,* Nov. 1986 Suppl. Vol.61, p.25-37, In German with English summary. 16 refs.

On the basis of new dating techniques applied to sediment samples collected in 1984/85, it is found that the prominent marine erosion surface on Fildes Peninsula, 35-45 m above mean sea level, is probably older than 85,000 years—older than the last interglacial period and the penultimate glaciation. These data indicate that an Eemian sea level, probably the maximum sea level was situated at 24 m above the present sea. All Holocene beaches, which are situated between 20 m and the present coastline, were formed during the last 6000 years. Before 6000 BP the islands were still completely glaciated. The breakdown of the ice cover to nearly the present extent must have been extremely abrupt, taking no more than 1000 years (6000 to 5000 BP), because fossil lake sediments, which were deposited between 5000 and 3000 BP, were found. Between 3000 and 1000 BP there were at least two re-advances. These advances were restricted to the prominent outlet glaciers, which followed pre-existing valleys. (Auth. mod.)

E-36989

Blümel, W.D., **Observations on the weathering of hard volcanic rocks of King George Island** [Beobachtungen zur Verwitterung an vulkanischen Festgesteinen von King George Island (S-Shetlands/W-Antarktis)], *Zeitschrift für Geomorphologie,* Nov. 1986 Suppl. Vol.61, p.39-54, In German with English summary. 13 refs.

Scanning electron micrographical observations on weathering volcanic rocks of King George I. demonstrate interrelations between

biological, mechanical and chemical decomposition of hard volcanic rocks (f.e. desquamation and biochemical decomposition caused by lichens; detrital weathering by radiation and diurnal frost; lee-weathering; formation of pedogene iron-layer with chemical fine-grained rock weathering; release of lithogenic clay minerals). Those processes underline the special position of maritime western Antarctica compared with cold and dry continental regions. Pedogenic hints to climatic changes occur within Holocene times. (Auth.)

E-36990

Löffler, E., **Macquarie Island—Mt. Wilhelm: periglacial features of a subantarctic island and comparison with a tropical mountain** [Macquarie Island—Mt. Wilhelm: Periglazialerscheinungen einer subantarktischen Insel und eines tropischen Hochgebirges im Vergleich], *Zeitschrift für Geomorphologie,* Nov. 1986 Suppl. Vol.61, p.55-64, In German with English summary. 18 refs.

The often claimed similarity of the periglacial solifluction features between the Subantarctic and the humid tropical mountains is examined using 2 examples—Macquarie I. and Mt. Wilhelm (New Guinea) —both areas being nearly isothermal in their climatic regimes. It is shown that despite some similarities in surficial solifluction features the differences are more striking. On Mt. Wilhelm the periglacial solifluction features are restricted to shallow screes and miniature patterned ground while Macquarie I. is dominated by thick solifluction debris which is differentiated into largely relict high terraces on leeward slopes and highly mobile solifluction screes on windward slopes. The differences in solifluction features can be explained by the different geomorphological development of the two areas during the Pleistocene caused by the different frost regime. On Macquarie I. a relatively small temperature depression changed the diurnal frost cycle to permafrost while on Mt. Wilhelm it did not alter the diurnal regime of frost and thaw. (Auth.)

E-37007

Stäblein, G., **Dynamics and development of arctic and antarctic coasts** [Dynamik und Entwicklung arktischer und antarktischer Küsten], Küste und Meeresboden: neue Ergebnisse geomorphologischer Feldforschungen (Coasts and seafloors: new geomorphological data from field research) edited by H. Klug, Kiel, FRG, Universität Kiel, 1985, p.1-18, In German with English summary. 35 refs.

The zonality of the coast forms and of the perimarine geomorphodynamics is proved for the Antarctic Peninsula and the South Shetland Islands. There are similarities with the arctic coasts caused by the polar climatogenetic conditions, but there are also some specifically antarctic characteristics. Eight groups of geomorphographic coasts are distinguished. The cryoclastic formation of cliffs and shore platforms, and the relict pebble beaches with elevated terraces are characteristic features. Traces of sea level changes are pebble occurrences up to 275 m above recent sea level, otherwise the young postglacial development is dated only a few meters above sea level. The long range Cenozoic tectonic elevation on the continental margin with intensive, young faults influences the perimarine phenomena. (Auth.)

E-37025

ODP Leg 113 scientific party, **Leg 113 explores climatic changes,** *Geotimes,* July 1987 32(7), p.12-15.

During the course of the voyage from Dec. 1986 through Mar. 1987, the party spent 65 days drilling 22 holes at 9 drill sites and recovered 1,946 m of core. It is expected that the core will provide the means to study the development of circum-antarctic water masses, growth of continental glaciation, and to explore climate changes. Core from Maud Rise will provide a biogenic record of antarctic waters; Dronning Maud Land margin of the Weddell Sea, a record of the East Antarctic continental climate; the deep Weddell Basin, a history of continental erosion and Antarctic Bottom Water; and the South Orkney microcontinent, the glacial history of West Antarctica. Details of examinations of these various core pieces are given.

E-37034

Parada, M.A., **Geology and petrography on the plutovolcanic complex on Half Moon Island, South Shetland Islands** [Geología y petrografía del complejo plutovolcánico de la isla Media Luna, islas Shetland del Sur], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.9-19, In Spanish with English summary. 11 refs.

Intrusive rocks with tholeiitic affinities and related volcanic sequence outcrop at the Half Moon I. The intrusive rocks are leucogabbros, diorites, qz-diorites, microdiorite porphyries and leucocratic qz-monzonite veins. The volcanic sequence includes basalts, andesites and volcanic breccia of similar composition, which exhibits hydrothermal alteration and/or contact metamorphism with variable intensity. Field relationships, petrographic observations and chemical data suggest the association of intrusive rocks resulting from a basic magma chamber evolution through a fractional crystallization process at low pressure. Some of the leucogabbro varieties seem to represent a plagioclase accumulation in the roof of the magma chamber and the qz-diorites and monzonitic veins would be the residual liquids. (Auth.)

E-37035

Godoy, E., Harrington, R., Tidy, E., **Anomalous character of recent volcanism in the South Shetland Islands** [Sobre el carácter "anómalo" del volcanismo reciente en las islas Shetland del Sur], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.21-32, In Spanish with English summary. 19 refs.

Early plagioclase fractioning is recognized in the high Sr, low Zr contents of pre-caldera Deception I. basalts. According to discriminatory diagrams, Deception basalts were formed in an intraplate environment with a "calcalkalic component". In a Ti/Y-Nb/Y diagram they, however, define an alkalic trend, close to the one from Grenada. Textural evidence and XRF analysis of dacite samples erupted from the SW-caldera rim, point instead to an origin through magma mixing. Two main cone basalts from Penguin I. show a Ti and Nb enrichment which lies in the "intraplate vector". A central cone basalt and one from the nearby Melville Peak are very Zr poor and represent the least differentiated members. Petrogenesis at Deception I. is controlled by its position close to a back-arc spreading center and by both pre-caldera fractioning and post-caldera mixing. Smaller amounts of basalt in Penguin I. and Melville Peninsula, on the other hand, originated under conditions similar to those of an intraplate environment, but underneath a deactivated calcalkalic arc. (Auth.)

E-37036

Banerji, J., Lemoigne, Y., Torres, T., **Significant additions to the Upper Triassic flora of Williams Point, Livingston Island, South Shetland Islands (Antarctica),** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.33-58, With French and Spanish summaries. 27 refs.

This paper presents some significant additions of fossil plants to the Upper Triassic flora of Livingston I. The mega fossil assemblage described here includes 13 taxa belonging to Pteridophytes and Gymnosperms *s.l.: Neocalamites, Marattiopsis, Dictyophyllum, Scoresbya, Cladophlebis, Dicroidium, Xylopteris, Sagenopteris, Caytonia, Taeniopteris, Sphenobaiera, Pagiophyllum* and *Elatocladus.* A late Upper Triassic age has been assigned to this palaeoflora. (Auth.)

E-37037
Palma-Heldt, S., **Palynological study on the Tertiary of King George and Brabant islands** [Estudio palinológico en el terciario de las islas Rey Jorge y Brabante, territorio insular antárticoJ, *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.59-71, In Spanish with English summary. Refs. p.69-71.

The palynological contents of 8 samples from King George and Brabant islands are analyzed and described. Fungal and fern spores, also Gymnosperm and Angiosperm pollen grains have been observed, and they may be compared to palynomorphs found in Tertiary rocks from Antarctica, South America, New Zealand and Australia. The chronology of palynomorphs of King George I. indicates a Lower Oligocene-Middle Oligocene (Miocene?) age. These palaeoenvironment indicators reveal the existence of a humid forest and temperate to cold temperatures for those islands. (Auth.)

E-37041
Luzio, W., Carrasco, A., Torres, T., **Chemical data on soil samples from King George Island** [Datos quimicos de muestras de suelos de la isla Rey Jorge, islas Shetland del Sur], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1987 No.36, p.147-150, In Spanish with English summary. 5 refs.

Surface glacial sediments from 3 locations on King George I., were sampled for an exploratory study of their chemical properties. The results show that these sediments have a high base saturation accounted for by a low-level leaching regime. These materials also have a high cation exchange capacity which, along with the low base leaching, would be an indication of the presence of some kind of smectite-type minerals. (Auth.)

E-37056
Meteoritical Society, **Abstracts of papers presented at the 50th annual meeting of the Meteoritical Society July 20-24, 1987, Newcastle upon Tyne, U.K.,** *Meteoritics,* Dec. 1987 22(4), p.309-547, Refs. passim.

Among the papers presented at the meeting, 42 pertain in some way to the Antarctic as investigators examined parts of the Yamato, Allan Hills, Elephant Island, and Lewis Cliff materials. The various aspects studied include chemical composition, mineralogy, temperature conditions, cosmic ray records, cosmic dust, weathering, age determination, and lunar sources.

E-37060
Wiens, R.C., Pepin, R.O., **Laboratory shock emplacement of noble gases, nitrogen, and carbon dioxide into basalt, and implications for trapped gases in shergottite EETA 79001,** *Geochimica et cosmochimica acta,* Feb. 1988 52(2), p.295-307, 47 refs.

Basalt samples have been analyzed mass spectrometrically for shock-implanted noble gases, N2, and CO2 after exposure to 20-60 GPa (200-600 kbar) shock in the presence of .0045-3.0 atm of ambient gas. Isotopically labelled gases were used in some samples to distinguish implanted atmospheric gases from contaminant or indigenous gases. Emplacement efficiencies for CO2 averaged a factor of 1.8 greater than those of N2 and noble gases in 4 samples with 20-50 GPa shock, and yielded 3.2 times greater efficiency in a sample shocked to 60 GPa. Enhanced CO2 emplacement is thought to be due to reaction with silicate materials. Data from shergottite EETA 79001 glass may be consistent with CO2 efficiencies a factor of 2-3 greater than noble gas efficiencies. Trapped gases in EETA 79001 glass were probably emplaced by shock. However, apparent emplacement efficiencies are somewhat higher than even shocked powder samples. Possible explanations for the difference include atmospheric overpressure at the time of shock, trapping of gas already in vugs by intruding melt material, or collapse of gas-filled vugs to form gas-laden glass inclusions. Not enough is yet known about the behavior of vugs under shock to discount the latter possibility. (Auth. mod.)

E-37063
Andronikov, A.V., Mikhaĭlov, V.M., Poliakov, M.M., Fedorov, L.V., **Results of geological investigations during the 28th and 29th Soviet Antarctic Expedition in the area of Lambert Glacier (East Antarctica)** [Rezul'taty geologicheskikh issledovaniĭ v sostave 28-ĭ i 29-ĭ SAE v raĭone lednika Lamberta (Vostochnaia Antarktida)], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.5-18, In Russian. 3 refs.

The 28th and 29th Soviet Antarctic Expedition (SAE) continued the geological investigations in the Beaver Lake area, on the western side of Lambert Glacier, carried out by the 11th, 17th and 19th SAE in 1966, 1972 and 1974. The previous results are reviewed, and results of new, radiometric investigations in the Prince Charles Mountains are tabulated and discussed. The schemes of stratigraphic structures of the northern portion of Jetty Lake, and Meredith, Lanyon and Astronauts mounts, are included.

E-37068
Klokov, V.D., Simonov, I.M., Kaup, E.B., Loopmann, A.A., **Studies of mountain lakes in the Unter-See region** [Issledovanie ozer gornogo oazisa Unter-Ze], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.45-50, In Russian. 1 ref.

From Dec. 2 to Dec. 15, 1983, a complex investigation of 2 main lakes within the Unter-See region, in the Wohlthat Mountains, was carried out by bathymetric measurements along several profiles. The ice thickness, the vertical temperature distribution and the concentration of dissolved oxygen were studied. The distribution of the water mineralization and the pH values were measured. Samples were collected for determination of nutrient content and concentrations of main ions, heavy metals and oxygen isotopes (O-18). The distribution of chlorophyll and the primary production of phytoplankton were determined by C-14 measurements. The vertical distribution of photoactive radiation (380-710 nm) was noted. Samples of phytoplankton and phytobenthos were conserved for determination of species distribution. Sediment was sampled for chemical analysis. The morphology of the lakes Unter-See and Ober-See and some chemical and biological data of fresh-water lakes, glaciers and snow of the oasis are presented in tables and figures.

E-37095
Chen, T., **Geological characteristics and tectonic nature of the Transantarctic Mountains,** *Geological review (Dizhi lunp'ing),* 1986 32(3), p.300-310, In Chinese. 48 refs.

The literature is reviewed of the geological structure of the Transantarctic Mountains, with details on Shackleton Range and Pensacola and Horlick mountains, including geochronological, geochemical, paleontological and petrological features. A map showing some characteristics of antarctic crustal structure, and another with stratigraphic characteristics of the mountains, are included.

E-37100
Rose, G., McElroy, C.T., **Coal potential of Antarctica,** *Australia. Bureau of Mineral Resources, Geology and Geophysics. Resource report,* 1987 No.2, 19p., 98 refs.

As little systematic sampling using standard procedures has been carried out, it is impossible to make a reliable interpretation of data from the approximately 200 coal specimens analyzed. Furthermore, the data refer to widely scattered localities, and do not provide a statistically reliable basis for assessing overall coal quality. However, the coals are dominantly bituminous or semi-anthracitic, the latter

coal rank being developed in the proximity of igneous intrusion. By normal coalfield geology standards, no progress has yet been made in assessing Antarctica's coal seams in terms of distribution, thickness and continuity, and subsequently towards the calculation, or even broadest estimation, of resources. Only rarely is information available on the extent of any particular coal seam beyond the observation made at a spot locality. The possibility of economic coal exploitation, using known technology, seems extremely doubtful owing to: the current insufficient knowledge of the deposits; the difficulties and great expense involved in upgrading this information using known exploration techniques; the environmental protection which would be required; the practical difficulties of mining; sociological factors; the balance between energy used and energy gained as a result of coal exploitation; and the economics of antarctic coal in a competitive world market. (Auth. mod.)

E-37110

Macdonald, D.I.M., **Preliminary assessment of the hydrocarbon potential of the Larsen Basin, Antarctica,** *Marine and petroleum geology,* Feb. 1988 5(1), p.34-53, Refs. p.51-53.

The Larsen Basin, on the northwest margin of the Weddell Sea, formed as a Mesozoic ensialic basin during Gondwana breakup. Deposition was either in half grabens on the extending Weddell Sea margin, or in a restricted back-arc basin. At the northern end of this basin 5-6 km of sedimentary rock crop out on James Ross I., exposing elements of a large potential hydrocarbon system. Aeromagnetic and outcrop data suggest that the basin structure inferred from James Ross I. can be recognized at least as far south as 70S. Upper Jurassic anoxic marine strata, deposited prior to the main phase of arc development, form a rich potential source (T.O.C. up to 3.5%) with both marine and terrestrial kerogens. Arc-derived volcaniclastic sediments of Barremian-Oligocene age form a regressive megasequence. Basal strata represent slope apron and rudaceous submarine fan deposits proximal to the margin; fan conglomerates form lenticular bodies hundreds of m thick and tens of km across, enveloped in slope-apron mudstones. Late Cretaceous fault reactivation and uplift led to dramatic shallowing of the basin, with deposition of shelf facies. In the Larsen Basin, there is moderate potential for oil generated from Upper Jurassic source rocks and reservoired in Cretaceous and Tertiary sandstones and conglomerates, in large stratigraphic or structural traps caused by partial basin inversion during deposition. (Auth. mod.)

E-37111

Colwell, J.B., **Seismic stratigraphy and evolution of the Raggatt Basin, southern Kerguelen Plateau,** *Marine and petroleum geology,* Feb. 1988 5(1), p.75-81, 15 refs.

Six major seismic stratigraphic sequences in the Raggatt Basin on the southern Kerguelen Plateau overlie a basement complex of Cretaceous or greater age. The complex includes dipping reflectors which were apparently folded and eroded before the Raggatt Basin developed. The seismic stratigraphic sequences include a basal unit, F, which fills depressions in basement; a thick unit, E, which has a mounded upper surface (volcanic or carbonate mounds); a depression-filling unit, D; a thick unit, C, which is partly Middle to Late Eocene; and two post-Eocene units, A and B, which are relatively thin and more limited in areal extent than the underlying sequences. A mid or Late Cretaceous erosional episode was followed by subsidence and basin development, interrupted by major erosion in the mid Tertiary. Late Cenozoic sedimentation was affected by vigorous ocean currents. (Auth.)

E-37112

Domack, E.W., **Biogenic facies in the antarctic glacimarine environment: basis for a polar glacimarine summary,** *Palaeogeography, palaeoclimatology, palaeoecology,* Feb. 29, 1988 63(4), p.357-372, 72 refs.

The association of glacial deposits (diamicts or tillites) with biogenic and/or chemically derived sedimentary rocks in the ancient rocks continues to challenge interpretation. An analogous association can be found on portions of the East Antarctic continental shelf, where relict glacial and glacimarine diamictons are overlain by a varied and complex suite of modern biogenic deposits. Carbonate bioclastic material can be found in two distinct zones and its deposition may have been contemporaneous with partial glacial expansion onto the shelf. A nearshore carbonate facies consists of *in situ* and partially reworked barnacles, bryozoans, ostracods, pelycepods, gastropods, planktonic and benthonic foraminifera. A siliceous biogenic component is intermixed within the shallow water (<250 m) carbonates and may locally predominate. Calcareous deposits are also found as graded sands and gravel lags on portions of shelf banks and adjacent continental slopes. A deep water (>500 m) siliceous facies, of pelagic, hemipelagic and sediment gravity flow (?) origin, is found within inner shelf depressions and consists predominantly of diatom frustules and radiolaria. These accumulations of siliceous ooze and mud clearly post date glacial recession from the shelf and contain laminated, cross-laminated, and massive interbeds which are accumulating at rates of 0.3 cm/yr. (Auth.)

E-37113

Crame, J.A., Howlett, P.J., **Late Jurassic and Early Cretaceous biostratigraphy of the Fossil Bluff formation, Alexander Island,** *British Antarctic Survey. Bulletin,* Feb. 1988 78, p.1-35, 84 refs.

A thick (3.6-3.8 km) succession of sedimentary rocks (the Fossil Bluff Formation) in the Ablation Valley-Callisto Cliffs-Planet Heights region of eastern Alexander I. passes through the Jurassic-Cretaceous boundary. It comprises a more or less continuous sequence from a disturbed (slumped) zone, through a conglomerate-dominated interval to a siltstone-dominated one, and finally, into interbedded siltstones and sandstones. One interpretation of this succession is that it represents a progressive regional shallowing event. The succession spans at least the Kimmeridgian to Aptian stages. No precise level can yet be fixed for the Jurassic-Cretaceous boundary, but it probably lies somewhere within the range of *R. everesti* at Callisto Cliffs. A rich Berriasian fauna has been recognized at 4 separate localities. This includes ammonites, several species of the belemnite *Hibolithes,* and a variety of both infaunal and epifaunal bivalves. Unfortunately, the succeeding levels are poorly fossiliferous and it has not been possible to distinguish the Hauterivian and Barremian stages with any degree of certainty. The base of the Aptian is defined by a basin-wide spread of aconeceratid ammonites, *Aucellina andina-radiatostriata* species group and *Inoceramus deltoides.* Further aconeceratids, lytoceratids and dimitobelid belemnites *(Tetrabelus willeyi)* characterize the remainder of the Aptian and constitute the youngest fauna in the study region. The faunas examined in this study exhibit a remarkable transition in biogeographic affinities which can almost certainly be linked with the progressive fragmentation of Gondwana and southward drift of Antarctica and Australasia. (Auth. mod.)

E-37132

Valle, R.A. del, Rial, P.A., Rinaldi, C.A., **Description and interpretation of a Cretaceous section of Seymour I.** [Descripción e interpretación de una sección del Cretácico superior de la isla Marambio, Antártida], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.345, 39p., In Spanish with English, German and French summaries. 12 refs.

A sedimentary section 575 m thick, corresponding to a sector of the López de Bertodano Formation that comprises the series of Cretaceous strata existing in the southwestern sector of Seymour I., is described and analyzed. In this succession, 8 minor stratigraphic units are distinguished which, because of their paleontological contents, sedimentary structures and lithologies, are interpreted as a

transgressive sequence deposited on transition and offshore marine environments. These correspond to intertidal plains and subtidal sectors, while the offshore environments are supraplatform. Within the intertidal deposits, thin lenses of carbonate rocks interpreted as probable deposits of calcareous algae, were found. The analysis of paleocurrent indicators shows that the coast paleoslope was directed towards the southeast, and the lithogenetical analysis allows to infer that the sedimentation occurred within a big estuary, but always with strong influence of tides and in the vicinity of the mouth of a big fluvial delta system. (Auth. mod.)

E-37159

Fröhlich, F., **Sedimentary phosphate occurrence on the Kerguelen-Heard Plateau** [Présence de dépôts phosphatés sur le plateau de Kerguelen-Heard (océan Indien)], *Académie des sciences, Paris. Comptes rendus. Série II,* June 14, 1986 303(2), p.167-170, In French with English summary. 10 refs.

Phosphate deposits occur at the eastern edge of the Kerguelen Plateau at depths ranging from 700 to 2,500 m, on outcrops of cretaceous to eocene chalks. This francolite mineralization is condensed in maestrichtian chalks and middle eocene argilites. As a result of the Kerguelen Plateau surrection above sea level, argilites have been eroded. This event gave rise to the deposit of secondary phosphatic coarse sands, gravels and pebbles. The primary phosphate deposits are determined by vertical motions, setting the plateau at shallow levels coinciding with the oceanic oxygen minimum. (Auth.)

E-37182

Barton, J.M., Jr., **Geology and geochronology of the Annandagstoppane granite, Western Dronning Maud Land, Antarctica,** *Contributions to mineralogy and petrology,* 1987 97(4), p.488-496, 44 refs.

The Annandagstoppane Granite is exposed at three nunataks in Western Dronning Maud Land. It comprises medium- to coarse-grained granite crosscut by veins of pegmatite and graphic granite and has many S-type characteristics. Whole rock and mineral isotopic data suggest: that Sr isotopes within it were nearly homogenized on a whole rock scale about 2823 Ma ago by hydrothermal alteration; that the Pb isotopic system was also disturbed at that time; and that the Granite was emplaced sometime during the interval 3115 Ma to 2945 Ma ago. The Granite was probably intruded by the Annandagstoppane Gabbro about 1200 Ma ago, resetting the Rb-Sr system in biotite. The Annandagstoppane Granite may form part of a basement complex to the Proterozoic sedimentary, volcanic and mafic igneous rocks exposed to the east in the Ahlmannryggen and the Borgmassivet. Its chemical composition and geologic history appears to be unique in Antarctica and in the Kaapvaal Craton of Southern Africa, consistent with the possibility that the Annandagstoppane Granite is part of a crustal fragment that joined Antarctica relatively late in the history of that continent. (Auth.)

E-37208

Barrocas, S.L.S., Gamboa, L.A.P., Maldonado, P.R., **First Brazilian marine geophysical expedition to Antarctica** [Primeira campanha Brasileira de geofísica marinha na Antártica], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Sep. 1987 No.12, p.11-14, In Portuguese.

On Jan. 6, 1987, the research vessel NOc. *Almirante Câmara* started work in antarctic waters. Seismic reflection, gravity and magnetic data were acquired in the area adjacent to the Antarctic Peninsula, between Elephant and Adelaide islands. Special attention was given to the geology of Bransfield Strait, where several dip and strike lines were shot. The acquired seismic data are now being processed by PETROBRÁS. The objectives of this cruise were: to investigate the structure of the Bransfield Basin; to assess whether the Shackleton and Hero fracture zones affect the areas of shallow basement adjacent to the Antarctic Peninsula; and to investigate the structure of Bellingshausen Continental Margin and its relation to the tectonic history of the adjacent seafloor. At the Bellingshausen Margin, a long basin located at the outer shelf was named Câmara Basin. The upper sequences of this basin are represented by prograding sediments. A large submarine fan, down-dip to the prograding clinoforms of Câmara Basin, is situated over the oceanic crust. The relative age of the clinoforms and the fan sediments will help decipher part of the complex evolutionary history of this margin. (Auth. mod.)

E-37209

Aitchison, J.C., Bradshaw, M.A., Newman, J., **Lithofacies and origin of the Buckeye Formation: Late Paleozoic glacial and glaciomarine sediments, Ohio Range, Transantarctic Mountains, Antarctica,** *Palaeogeography, palaeoclimatology, palaeoecology,* Mar. 1988 64(1/2), p.93-104, 35 refs.

Up to 300 m of glaciogenic late Paleozoic Buckeye Formation rest unconformably upon an erosional surface cut on, and in places through, early Devonian Horlick Formation in the Ohio Range. The diamictite exhibits a gradual transition upsection from direct glacial to subsequent glaciomarine deposition. Lowermost beds include diamictite deposited directly from grounded ice. Numerous striated pavements indicate paleo-ice-flow from west to east. Upsection many beds are internally stratified and this, with the presence of fine laminated interbeds, provides evidence of subaqueous deposition. Geochemical, textural and paleontological data suggest a marine influence. Towards the top of the Buckeye most diamictite horizons are horizontally stratified with a decreasing proportion of small dropstones. Buckeye Formation is conformably overlain by Discovery Ridge Formation beds of probable shallow marine origin. (Auth.)

E-37210

Stubblefield, S.P., Taylor, T.N., Trappe, J.M., **Vesicular-arbuscular mycorrhizae from the Triassic of Antarctica,** *American journal of botany,* Dec. 1987 74(12), p.1904-1911, 30 refs.

Silicified roots from the Triassic of Antarctica show features of extant vesicular-arbuscular mycorrhizae (VAM). Nonseptate fungal hyphae occur within and between well-preserved parenchymatous cells of the central cortex. Terminal and intercalary swellings comparable to chlamydospores and vesicles are also present within the roots. In addition, three-dimensionally branched structures nearly fill the host cell and resemble modern day arbuscles. Although possible mycorrhizae have been reported as early as the Devonian, and are widely accepted, fossil arbuscles, the most definitive feature of VAM, have not been previously described. The fungi associated with the antarctic roots provide the most complete and convincing evidence for pre-Pleistocene VA mycorrhizae in the fossil record. (Auth.)

E-37212

Tagai, T., **Volcanic glass and Ca-rich anorthoclase from Mt. Erebus, Antarctica** [Vulkanisches Glas und Ca-reicher Anorthoklas von Mt. Erebus, Antarktis], *Neues Jahrbuch für Mineralogie. Abhandlungen,* Jan. 1988 158(2), p.167-174, In German with English summary. 6 refs.

Ca-rich anorthoclase was detected besides volcanic, porous glass in material collected after an eruption of Mt. Erebus. Chemical analyses have shown the homogeneity of the anorthoclase. This absence of exsolution indicated the formation at equilibrium with molten glass and a fast cooling rate. The crystals are twinned and an analysis of the microstructure by electron microscopy demonstrated cross-hatched twins as a function of the triclinic-monoclinic transformation. The transition temperature was determined at 750 C by *in-situ* heating precession experiments. Thermoanalysis determined the glass temperature near 1000 C. EXAFS-experiments give some evidence to

six-coordinated Fe in the glass. The chemical composition is discussed by the Seger formula. (Auth.)

E-37226

Zarikhin, I.P., **Submeridional morphostructures of antarctic submerged margin** [Submeridional'nye morfostruktury podvodnoĭ okrainy Antarktidy], Kompleksnye rybokhoziaĭstvennye issledovaniia VNIRO v Mirovom okeane (Complex investigations of the All-Union Institute of Fisheries and Oceanography on fishing resources in the world ocean). Edited by D.E. Gershanovich, Moscow, 1987, p.95-113, In Russian with English summary. Refs. p.110-113.

Subglacial morphostructures of Antarctica and the relationship with submarine submeridional structures adjacent to the submerged margin are described, and a comparison between shelf, slope and continental rise of eastern and western Antarctica is presented. Some similarity and differences of major morphostructures in the age of the rocks forming them, relief morphology and genesis, are considered. Submarine, submeridional ridges Gunnerus and Lazarev originated from the Mesozoic-Cenozoic fractures and were formed by basement rocks. The submeridional rise and seamount Mod are related to volcanic origin and are referred to as a great fracture. The submeridional Shackleton ridge and a series of Swelling rises in the eastern Scotia Sea are analyzed. The volcanic chain of the South Sandwich Is. and the eastward deepwater trench are the youngest morphostructural formations limited by the sublatitudinal fractures (the Falkland and Bouvet islands.) (Auth.)

E-37236

Conca, J.L., **Differential weathering effects and mechanisms,** Pasadena, California Institute of Technology, 1985, 251p., University Microfilms order No.85-22607, Ph.D. thesis. Refs. p.213-225.

The physical and chemical characteristics of the two differential weathering effects, case hardening and core softening, are examined to determine their formation mechanisms by investigating several field areas exhibiting differential weathering effects. Because differential weathering effects are defined on the basis of spatial variations in relative and absolute hardness, a portable field instrument has been developed to measure rock hardness as manifested in the abrasion resistance of the material. The design and operation of the instrument as well as results from standard materials are discussed in light of abrasive wear theory. The differential weathering effects developed in the Ferrar dolerite within the Labyrinth of the Dry Valleys, are caused by two different mechanisms. The primary mechanism is precipitation of a brown, iron-stained silica coating in the exterior rock of outcrops and joint blocks. A less common differential mechanism occurs in the bottom of the antarctic Labyrinth troughs in which an eolian polish develops on rock surfaces exposed to the austral winter winds. Development of the polish protects the underlying material with similar, but less dramatic effects, than accompanies the presence of the silica coating. Outside the Labyrinth, the silica coating forms on the dolerite mostly on exposed surfaces which are at or near the soil level, from precipitation at the rock-atmosphere interface. Subsequent lowering of the soil level leaves these exteriors as higher-standing, resistant surfaces which can be undercut by weathering along their exposed vertical sides. The resulting morphology observed in the field mimics the contours of the matric suction produced by a two-dimensional model of saturated flow within a dolerite block. (Auth. mod.)

E-37246

Stump, E., Miller, J.M.G., Korsch, R.J., Edgerton, D.G., **Diamictite from Nimrod Glacier area, Antarctica: possible Proterozoic glaciation on the seventh continent,** *Geology,* Mar. 1988 16(3), p.225-228, 27 refs.

Late Proterozoic glacial deposits have been found on all continents except Antarctica. Here four units of Late Proterozoic diamictite are described, with a total thickness of about 10 m, from Panorama Point, Nimrod Glacier area, which have characteristics compatible with glaciogenic origin. The diamictite occurs within Goldie Formation, a sequence of marine turbidites, and is associated with a unit of mafic pillow lavas. The diamictite is commonly structureless and in places laminated. Coarse clasts occur as scattered pebbles and cobbles and as pebbly pods and beds. No striated or faceted clasts were found. A few pebbles may pierce the laminae, but a dropstone origin is uncertain. Deformation and metamorphism have obscured subtleties of original sedimentary structure. Outsize clasts in laminated sandy siltstone (now schistose) suggest a glaciogenic origin for these diamictites, but deposition by mass-flow processes cannot be ruled out. The discovery in Antarctica of possible late Proterozoic glaciogenic deposits extends their geographic distribution to all of the major continental masses. (Auth.)

E-37247

Pankhurst, R.J., **Cambrian-Ordovician magmatism in the Thiel Mountains, Transantarctic Mountains, and implications for the Beardmore orogeny,** *Geology,* Mar. 1988 16(3), p.246-249, 17 refs.

New field and laboratory studies result in a redefinition of the 3 main lithostratigraphic units of the Thiel Mountains. These are (1) the Thiel Mountains porphyry, a massive hypersthene-bearing monzonite, faulted against (2) the Mount Walcott Formation, a sequence of shallow-water volcaniclastic sedimentary rocks and dacitic tuffs or flows, and (3) the Reed Ridge granites, coarse-grained biotite granite/granodiorite stocks that cut the porphyry. Genetic relations between the porphyry and both the sedimentary rocks and the granite are proposed. Evidence for a Phanerozoic age indicated by the presence of fossils in the sediments is reinforced by Rb-Sr whole-rock dating that has conclusively established a Late Cambrian or Early Ordovician age (502 Ma) for the entire sequence. The stratigraphic and tectonic consequences refute all evidence for magmatism in the Transantarctic Mountains associated with the Precambrian "Beardmore orogeny," the age and status of which are now in doubt. (Auth.)

E-37253

McCartan, L., Bradshaw, M.A., **Petrology and sedimentology of the Horlick Formation (Lower Devonian), Ohio Range, Transantarctic Mountains,** *U.S. Geological Survey. Bulletin,* 1987 No.1780, 31p., 29 refs.

The Horlick Formation of Early Devonian age is as thick as 50 m and consists of subhorizontal, interbedded subarkosic sandstone and chloritic shale and mudstone. The Horlick overlies an erosion surface cut into Ordovician granitic rocks and is, in turn, overlain by Carboniferous and Permian glacial and periglacial deposits. Textures, sedimentary structures, and ubiquitous marine body fossils and animal traces suggest that the Horlick was deposited on a shallow shelf having moderate wave energy and a moderate tidal range. The source terrane probably lay to the north, and longshore transport was toward the west. (Auth.)

E-37259

Leclaire, L., **Lower Cretaceous basalt and sediments from the Kerguelen Plateau,** *Geo-marine letters,* 1987 7(4), p.169-176, 25 refs.

Geological samples from the southern Kerguelen Plateau include Lower Cretaceous basalt and lava breccia, probable Lower Cretaceous conglomerate and shelf limestone, Upper Cretaceous chert with dolomite, Upper Cretaceous-Eocene ooze, and Tertiary conglomerate. Neogene sediments are only a few hundred m thick, and include foraminiferal and diatomaceous ooze, and ice-rafted debris. In conjunction with seismic reflection profiles, the samples indicate Early Cretaceous near-shore volcanism, followed by erosion, sedimentation,

and subsidence through Cretaceous; arching of the plateau at the end of Cretaceous; subsidence through Paleogene; widespread emergence in mid-Tertiary; and slow subsidence through Neogene. A scheme of the evolution of the Plateau, from the initial separation of Australia and Antarctica to the outcrop on Heard and Kerguelen islands, is proposed. (Auth. mod.)

E-37261

Maund, J.G., Rex, D.C., Le Roex, A.P., Reid, D.L., **Volcanism on Gough Island: a revised stratigraphy,** *Geological magazine,* Mar. 1988 125(2), p.175-181, 12 refs.

Recent field work on Gough I. combined with K-Ar dating of the lavas requires revision of the age and volcanic stratigraphy. Four main periods of volcanic activity on the island are recognized. These comprise the eruption of the Older Basalt Group which ranges in age from 2.5 to 0.52 Ma, the intrusion of aegirine-augite trachyte plugs (0.8-0.47 Ma), voluminous trachyte extrusion (0.30-0.12 Ma) and finally the eruption of the Edinburgh Basalt (0.20-0.13 Ma). Within the Older Basalt Group 3 phases of activity can be recognized; the earliest involving the eruption of pillow basalts and hyaloclastites when the island emerged from below sea level. This was followed by subaerial aa-type lava flows and also dyke intrusion (phase two) which probably contributed to forming a large shield-type volcanic island, which in turn supported the eruption and deposition of flat-lying flows on an angular unconformity (phase three). Intrusion of aegirine-augite trachyte plugs occurred concurrently with the latter stages of Older Basalt eruption. After a period of considerable erosion the voluminous trachyte lavas and pyroclastics were erupted. The Edinburgh Basalt, erupted in the vicinity of Edinburgh Peak, represents the youngest volcanic activity on the island. (Auth.)

E-37263

Velbel, M.A., **Distribution of evaporitic weathering products on antarctic meteorites,** *U.S. National Aeronautics and Space Administration. Contractor report,* Nov. 1987 NASA-CR-1720009-Vol.2, p.32/1-32/20, N88-14888, 18 refs.

White evaporite deposits of terrestrial origin occur on some 5% of antarctic meteorites. The few previous studies, and new mineralogical analyses, indicate that the deposits are predominately carbonates and/or sulfates of magnesium. The distribution of white evaporitic salt deposits differs among different meteorite compositional groups and weathering categories. Almost two-thirds of all evaporite-bearing meteorites belong to weathering categories, A, A/B, and B. Meteorites of weathering categories B, A/B, and even A may have experienced significant element redistribution and/or contamination as a result of terrestrial exposure. (Auth. mod.)

E-37268

Rabassa, J., **Drumlins and drumlinoid forms in northern James Ross Island, Antarctic Peninsula,** Drumlin Symposium [First International Conference on Geomorphology,] Manchester, Sep. 16-18, 1985, Rotterdam, Netherlands, A.A. Balkema, 1987, p.267-288, Refs. p.286-288.

Drumlins and drumlinoid forms have been identified at Bahía Bonita, James Ross I. These landforms are part of the ground moraine of a debris-covered glacier, which existed during Holocene times and extended below sea-level. This glacier had, at that time, a partially-floating ice tongue. Both drumlins and drumlinoid forms occur together in a wider drumlin field, with their long axes arranged parallel and reflecting the ice motion. Striations and crescentic marks have been frequently observed in boulders found at the drumlins' surface. The striae are consistent with the drumlin long-axes' orientation. The occurrence of drumlins and related striations suggests that the glacier which occupied the Bahía Bonita valley during Holocene times was an active, wet-based, temperate glacier. (Auth. mod.)

E-37274

Tokarski, A.K., Danowski, W., Zastawniak, E., **On the age of fossil flora from Barton Peninsula, King George Island, West Antarctica,** *Polish polar research,* 1987 8(3), p.293-302, 23 refs.

Three tectonic units occur in folded stratified volcanic sequence on Barton Peninsula. Fossil flora (Del Valle *et al.* 1984) occurs in the basal part of the upper unit whose age is not younger than Paleocene. The rocks of the middle and lower units are older, possibly Mesozoic. (Auth.)

E-37288

Semenov, V.S., Solov'ev, I.A., **Late Archean-Early Proterozoic metamorphic belts of the Shackleton Range and the Prince Charles Mountains (Antarctica),** *Geotectonics,* 1986 (Pub. Apr. 1987) 20(5), p.373-388, Translated from Geotektonika. 36 refs.

Data from Soviet investigations of the geological structure and development of two Late Archean-Early Proterozoic metamorphic belts on the East Antarctic craton are reviewed. The evolution of the geothermal regimes of metamorphism, and their specific character and connection with the fold deformations, have been studied. The metamorphic belts of the Shackleton Range and the Prince Charles Mountains are comparable with those of Alpine type and are typical of the proto-eugeosynclinal phase of crustal evolution, reflecting the beginning of lateral differentiation of the endogenic regimes around the Archean proto-platforms. The deepest regimes of metamorphism of the kyanite-sillimanite series have been revealed in the Shackleton Range, in a zone of proto-eugeosynclinal development, where a special assemblage of associations has been identified: basaltic (spilite-diabase), picrite-basalt, and gabbro-norite-ultramafic. (Auth. mod.)

E-37314

Kleinschmidt, G., Tessensohn, F., Vetter, U., **Paleozoic accretion at the paleopacific margin of Antarctica,** *Polarforschung,* 1987 57(1/2), p.1-8, 18 refs.

The configuration of northern Victoria Land forms at present the best base for a discussion of the Paleozoic accretionary history of the Antarctic Shield because of the relatively good and numerous rock exposures, the position near the Pacific margin of the East Antarctic Craton, the relatively good level of knowledge, and the concentration of research activities during the last 10 years. The basement of northern Victoria Land consists of three main structural units: A) the Wilson Terrane is built up of metamorphic rocks ranging from greenschist facies up to anatexis and migmatization. The ages of the protoliths of the gneisses, mica schists or calc silicate rocks are not known. The deformation and metamorphism are polyphase. B) The Bowers Terrane contains a large variety of rocks formed during the Cambrian to Ordovician, including conglomerates, quartzites, limestones, turbiditic sandstones, and most of all volcanics of a tholeiitic composition. The metamorphism is mainly of a very low grade; the deformation is mostly singlephase. C) The Robertson Bay Terrane comprises a flyschoid turbidite sequence of Eocambrian to Cambrian age. The metamorphism is of a very-low grade just reaching the greenschist facies in some localities at the western margin. Rocks are generally folded in a simple open, and weakly NE-verging manner, and are usually well cleaved. Three models have been suggested to explain the structural configuration of northern Victoria Land and its tectonic development. These models are examined and discussed. (Auth. mod.)

E-37315

Olesch, M., Schubert, W., **Different zoning patterns in tourmalines from north Victoria Land pegmatites, Antarctica,** *Polarforschung,* 1987 57(1/2), p.9-15, With German summary. 10 refs.

Tourmaline is an important indicator for the petrogenesis of the pegmatites from North Victoria Land. Depending upon the lithology of the pegmatitic wall rocks, tourmaline crystals show different zoning patterns. Tourmalines from pegmatites intruded in granitoid rocks of the Granite Harbor intrusives are normally zoned with schorl rich, but dravite and uvite poor cores. The rim composition behaves antagonistically. Tourmalines from pegmatites injected in medium-grade biotite—sillimanite bearing metapelites are inversely zoned with dravite and uvite rich, but schorl poor cores. The inversion of the normal zoning is caused by metasomatic influence of the metapelitic wall rocks. The zoning pattern of tourmalines from Antarctica has not only regional importance, but may serve generally as an indicator for metasomatic alteration of pegmatites. (Auth.)

E-37316

Schubert, W., Olesch, M., **Metamorphic processes in the Transantarctic crystalline basement, Pacific section, Antarctica,** *Polarforschung,* 1987 57(1/2), p.17-26, With German summary. 27 refs.

The Precambrian basement of northern Victoria Land is built up in the west by a metamorphic belt of low-pressure regime and in the east by a metamorphic belt of medium-pressure regime. The two belts are separated by the Rennick-Aviator line. The petrological treatment of critical minerals and mineral relics allows the construction of P-T loops in the P-T diagram. The western belt is characterized by simple prograde mineral reactions of medium-grade to high-grade metamorphism under low-pressure conditions. The eastern belt bears relictic parts from greater crustal depth. These are: kyanite-sillimanite transitions, the critical mineral assemblage staurolite —talc—corumdum, relictic textures from former granulite- or kyanite-eclogite facies, and ultramafic upper mantle assemblages including spinel- and garnet-olivine pyroxenites. Starting from different pressure regimes the development of all P-T paths meets under amphibolite facies conditions of the main Ross orogenetic event, apart from younger retrogressive stages. (Auth.)

E-37317

Wörner, G., Viereck, L., **Subglacial to emergent volcanism at Shield Nunatak, Mt. Melbourne volcanic field, Antarctica,** *Polarforschung,* 1987 57(1/2), p.27-41, With German summary. 33 refs.

Sections through Shield Nunatak volcano, an alkali basaltic subglacial table mountain from the Mt. Melbourne Volcanic Field, are described. Resting on a base of older lava flows and a fossile tillite layer, the volcano is formed mainly by massive ash and lapilli (mass flow) deposits while pillow lavas are absent. The recurrent stage of emergence from subglacial to subaerial conditions is characterized by development of tuff rings from explosive interaction between magma and melt water, complex ash and lapilli deposits, including lava flows brecciated by water interaction and a subaerial basaltic ash-flow deposit. The sequence is capped by subaerial tuff rings, lava flows, scoria cones and reworked tephra. Available data on subaquatic explosive volcanism indicate that early Shield Nunatak basaltic lavas erupted under less than 300 m of ice cover; later lavas erupted under shallow-water and subaerial conditions. The volcano has suffered only minor glacial erosion and still almost has its original shape. (Auth.)

E-37318

Hoecker, G., Amstutz, G.C., **Petrography of the Mesozoic intrusive suite of the Palmer Archipelago, Antarctic Peninsula, with particular regard for geochemical layer considerations** [Petrographie der mesozoischen Magmatite im Gebiet des Palmer Archipels (Antarktische Halbinsel) unter besonderer Berücksichtigung von geochemisch-lagerstättenkundlichen Gesichtspunkten], *Polarforschung,* 1987 57(1/2), p.43-57, In German with English summary. 22 refs.

Volcanic formations and intrusive series are the dominant exposed rocks together with very subordinate metasediments. Different petrological and isotopic data suggest the division of the Antarctic Intrusive Suite into two intrusive types: Palmer Batholith and Costa Danco intrusive rocks. Both types belong to a calc-alkaline series. The granitoid rocks show an I-type affinity. Ore minerals are mainly restricted to the intermediate rock types. Propylitisation and kaolinisation are the observed alteration types, which suggest the comparison with the andean Porphyry-Copper and vein-type deposits. The volcanic formations are subdivided into the Upper Cretaceous Wiencke Formation and the Jurassic Lautaro Formation. These calc-alkaline volcanic rocks apparently are part of an island arc. A strong alteration of primary minerals is very common; however, the low ore mineral content does not change significantly within the different alteration types. (Auth. mod.)

E-37319

Miller, H., Loske, W., Kramm, U., **Zircon provenance and Gondwana reconstruction: U-Pb data of detrital zircons from Triassic Trinity Peninsula formation metasandstones,** *Polarforschung,* 1987 57(1/2), p.59-69, With German summary. 49 refs.

Morphological and U-Pb isotope studies on sedimentary zircons reflect the orogenic evolution of their former host rocks. The orogenic history of detrital zircons from the Trinity Peninsula Formation (TPF) defines the former geological surrounding of the sedimentation basin of the TPF. Some few well rounded, polycyclic zircons of Precambrian age and Cambrian overprint give hints for an old cratonic source rock. Because of their very low frequency compared with euhedral types, the contribution of cratonic shield areas to the bulk of the sedimentary debris is negligibly low. Euhedral zircons of granitoid origin and Carboniferous age indicate a derivation from an area of widespread Carboniferous intrusions. Except for southern South America and unsurveyed regions in the Antarctic Peninsula itself, no region could deliver zircons with a Carboniferous age record. The only acceptable explanation for the origin of these zircons is a position of the Antarctic Peninsula during the sedimentation of the TPF approximately southwest of southern South America. (Auth.)

E-37320

Spaeth, G., Fielitz, W., **Structural investigations in the Precambrian of western Neuschwabenland, Antarctica,** *Polarforschung,* 1987 57(1/2), p.71-92, With German summary. 15 refs.

The mountains of the Ahlmannryggen are built up of a sedimentary-volcanogenic platform sequence with mainly mafic intrusions of Proterozoic age. Besides a prevailing fracture tectonic indicating extension, steep shear zones and overthrusts occur. For the small-scale but numerous overthrusts an Early Palaeozoic age is assumed as the most probable. It is notable that all main tectonic structures of the Ahlmannryggen run NE-SW to NNE-SSW, which is parallel to the Jutulstraumen graben, an important regional rift structure. Heimefrontfjella and Mannefallknausane are composed of metamorphic rock units of assumed and partly proved Precambrian age. The rock units are partly in amphibolite facies, partly in granulite facies and show retrograde metamorphism in places. Several different deformation

acts can be recognized from polyphase structures. Fracture tectonics connected with metamorphic and non-metamorphic basic dikes occur as well as overthrust and nappe tectonics. Besides this, it is possible to distinguish at least two interfering fold generations. The older one runs NW-SE and shows a NE-vergence, the younger one runs NE-SW and shows a NW-vergence. An important steeply dipping shear zone separates metamorphic units of different structural levels over long distances. Considerations on regional structural correlations between the Precambrian of the Ahlmannryggen and of Heimefrontfjella and Mannefallknausane lead to interpretations concerning the effects of the Ross Orogeny in the region of western Neuschwabenland. Similarities to the geologic structures of eastern South Africa are demonstrated. (Auth.)

E-37321

Spaeth, G., Schüll, P., **Survey of Mesozoic dolerite dikes from western Neuschwabenland, Antarctica, and their geotectonic significance,** *Polarforschung,* 1987 57(1/2), p.93-113, With German summary. 22 refs.

In western Neuschwabenland basic dikes occur in the Jurassic lavas and Permian sediments of Vestfjella as well as in the Precambrian sedimentary-volcanogenic rock sequence of the Ahlmannryggen and in the Precambrian crystalline complexes of Heimefrontfjella and Mannefallknausane. The concentration of the dikes in Vestfjella is conspicuous. Two main directions of strike perpendicular to each other are recognizable, from which the NE-SW striking one is predominant. The direction of the dikes coincides with the Mesozoic and younger fracture tectonics. Age relationships by structural, petrographical and geochemical observations are confirmed by palaeomagnetic and radiometric age determinations. Considerations on the geochemistry of further dolerite occurrences from Antarctica and other regions of the Gondwana continent are pointed out. Finally comparisons with the analogous South African dike system show the geotectonic significance of the dolerite dikes for the break-up of Gondwana. (Auth.)

E-37322

Matthies, D., Troll, G., **Importance of biogenic opal sediment input for the fluorine chemistry of antarctic marine sediments (Bransfield Strait and Weddell Sea),** *Polarforschung,* 1987 57(1/2), p.115-121, With German summary. 17 refs.

The influence of biogenic opal sediment input (mainly diatom skeletons) on the fluorine budget of marine sediments is shown for 24 sampling stations in Bransfield Strait, Powell Basin, South Orkney Plateau and northwestern Weddell Sea. Four bulk samples, one from each sedimentation area, contain 9 to 28 wt.-% of biogenic opal, the clay fraction of the 24 samples investigated have 2 to 82 wt.-%. The fluorine concentration in the amorphous biogenic component is 15 ppm. 300 to 800 ppm of fluorine were measured in the clay fractions, 330 to 920 ppm in their lithogenic components. Biogenic opal causes a decrease in fluorine concentration of the sediment by a considerable amount: 6 to 56% relative to the clay fraction, due to the proportions involved. Biogenic opal is therefore taken into account as a "diluting" factor for the fluorine budget in marine sediments. (Auth.)

E-37330

Gooding, J.L., Wentworth, S.J., Zolensky, M.E., **Calcium carbonate and sulfate of possible extraterrestrial origin in the EETA 79001 meteorite,** *Geochimica et cosmochimica acta,* Apr. 1988 52(4), p.909-915, 32 refs.

Two varieties of Ca-carbonate were found in a total of three interior samples of glass inclusions from the shergottite meteorite EETA A79001. Two of the samples, including the largest deposit around a vug near the center of the meteorite, containing veins of granular calcite with significant magnesium and phosphorus either as Mg-calcite with dissolved P or as calcite with very finely intergrown Mg-bearing phosphate. The second variety, which occurred in a third sample with a previously documented high concentration of trapped gases, consisted of disseminated 10-20 micron, anhedral grains of nearly pure CaCO3 and was intimately associated with laths and needles of Ca-sulfate. The coexisting carbonate and sulfate appeared to be partially decrepitated, relict grains that were trapped during rapid solidification of quench-textured pyroxene and glass. For at least the latter occurrence, textural relationships clearly indicate a pre-terrestrial origin for the salts. All evidence considered, it is probable that both varieties of Ca-carbonate and the Ca-sulfate formed on a planetary body, probably Mars before the meteorite fell on Earth. (Auth.)

E-37331

Wright, I.P., Grady, M.M., Pillinger, C.T., **Carbon, oxygen and nitrogen isotopic compositions of possible Martian weathering products in EETA 79001,** *Geochimica et cosmochimica acta,* Apr. 1988 52(4), p.917-924, 37 refs.

Carbon and oxygen isotopic analyses of carbonate-rich "white-druse" material isolated from a contact between lithologies A anc C of the EETA 79001 shergottite indicate that this component is probably extraterrestrial in origin, and not simply an antarctic weathering product. The *delta*C-13 and *delta*O-18 values of the calcium carbonate are unlike *delta*C-13/*delta*O-18 combinations of most terrestrial carbonates. However, *delta*C-13 and *delta*O-18 of the carbonates in EETA 79001 are very similar to the corresponding values for carbonates analyzed from Nakhla, a meteorite closely allied to shergottites. It seems apparent that the carbonate minerals in these SNC meteorites were formed on the meteorites' parent body (Mars?). Isotopic analysis of nitrogen liberated during combustion of a carbonate-rich fraction of EETA 79001 does not give any clear evidence for the N-15-enriched component isolated from EETA 79001 lithology C glass and postulated as trapped martian atmosphere. However, substantial amounts of nitrogen were present; the origin of these components is unclear but the low temperature of release poses some constraints. (Auth.)

E-37332

Clayton, R.N., Mayeda, T.K., **Isotopic composition of carbonate in EETA 79001 and its relation to parent body volatiles,** *Geochimica et cosmochimica acta,* Apr. 1988 52(4), p.925-927, 25 refs.

Calcite, a probable extraterrestrial weathering product in the shergottite EETA 79001, has *delta*C-13 = +9.7 per mill and *delta*O-18 = +21.0 per mill. In order to account for the large excess of O-18 relative to the silicate substrate (*delta*O-18 = +4.2 per mill), a parent body surface reservoir containing both water and carbon dioxide is required. The inferred H2O/CO2 ratio is consistent with estimates for the degassed reservoir on Mars. (Auth.)

E-37333

Smith, C.G., **Geology of parts of the west coast of Palmer Land,** *British Antarctic Survey. Scientific reports,* 1987 No.112, 101p., Refs. p.98-101.

The geology of parts of the west coast of Palmer Land is described and 107 new chemical analyses are presented. The oldest exposed rocks are considered to be wedges of granitic and granulitic pre-Mesozoic continental crust which, together with (?) Carboniferous sedimentary and volcanic rocks, were regionally metamorphosed during the early Mesozoic Gondwanian orogeny. Most of the metamorphic rocks are banded gneisses which were derived from mineralogically and chemically similar synkinematic tonalites by metamorphic differentiation. Diorite-gneisses, metagabbros and two generations of amphibolites (meta-basic dykes) are also present. The textures and mineralogical assemblages of these rocks are typical products of high-temperature-low-pressure metamorphism, suggesting the area lay above an easterly dipping subduction zone. Three metamorphic events, ranging from upper amphibolite to

greenschist facies, and two associated episodes of potash metasomatism are recognized. Granites of limited areal extent, which are chemically and mineralogically different from later plutonic rocks, were emplaced late in the second metamorphism. (Auth. mod.)

E-37338

Giret, A., Chotin, P., Verdier, O., **From lava to plutonic rocks. The example of Mount Ross, Kerguelen Islands** [Des laves aux roches plutoniques. L'exemple du mont Ross, îles Kerguelen], *Académie des sciences, Paris. Comptes rendus. Série 2,* Feb. 7, 1988 306(5), p.381-386, In French with abridged English version. 6 refs.

Mount Ross is a recent volcano (4 to 0.2 M.a. old), 1,850 m high, with a radius of 8 km. The total volume of magmatic products (lava flows, explosives and extrusions) is evaluated at 135 cu km and corresponds to a 660 m subsidence of a cylindrical cauldron of the same diameter. Mapping carried out in 1987 led to the recognition of two main magmatic periods. The first, which built the major part of the volcano, is mainly basaltic. The second consists of numerous peripheral trachytic and phonolitic extrusions and lava-flows refilling some radial valleys of the pre-existing volcanic cone. The presence of plutonic intrusions in the volcanic core, with abundant gabbros and monzonites located at 1,000 m below the summit illustrates the volcano-plutonic nature of this magmatism, typical of the Kerguelen Is. (Auth.)

E-37339

Barker, P.F., **Preliminary results of ODP Leg 113 of *Joides-Resolution* in the Weddell Sea: history of antarctic glaciation** [Résultats préliminaires de la campagne 113 du *Joides-Resolution* (Ocean Drilling Program) en mer de Weddell: histoire de la glaciation antarctique], *Académie des sciences, Paris. Comptes rendus. Série 2,* Jan. 7, 1988 306(1), p.73-78, In French with abridged English version. 3 refs.

Joides-Resolution visited the Weddell Sea from Jan. 5 to Mar. 11, 1987. Twenty-two holes were drilled at 9 sites, and allowed the following: to find evidence of strong cooling during the early Oligocene in East Antarctica, during the middle Miocene in West Antarctica; to demonstrate the presence of ice during the Oligocene in East Antarctica, and the early late Miocene in West Antarctica; and to establish the age of formation of the ice sheets, during the middle Miocene in East Antarctica, and the late Miocene in West Antarctica, and provide evidence of their stability since the first stages of their development. (Auth.)

E-37347

Smith, V.R., **Seasonal changes in plant and soil chemical composition at Marion Island (Sub-Antarctic): I—Mire grasslands,** *South African journal of antarctic research,* 1987 17(2), p.117-132, With Afrikaans summary. 47 refs.

The seasonal changes in concentrations of N, P, K, Ca, Mg and Na in the plants at two mire-grasslands are described. In general, N, P and K concentrations in the aboveground biomass decreased, and those of Ca (sometimes also Mg) increased as the season progressed. Concentrations of N, P and Mg in the aboveground biomass of graminoid species at the island are low compared with most graminoids at tundra mires and meadows or at montane grasslands, sedge-heaths and freshwater wetlands of more temperate latitudes. K concentrations in the island graminoids are similar to those at Arctic and sub-Arctic tundras but are greater than those for most sedges and grasses at more temperate moorland sites. Ca concentrations in all the island species considered in this study are markedly lower than for plants from tundra and tundra-like areas. There were no conspicuous seasonal variations in soil nutrient levels at the two mire-grasslands. (Auth.)

E-37348

Smith, V.R., **Seasonal changes in plant and soil chemical composition at Marion Island (Sub-Antarctic): II—Fjaeldmark and fernbrakes,** *South African journal of antarctic research,* 1987 17(2), p.133-154, With Afrikaans summary. 46 refs.

Seasonal changes in concentrations of N, P, K, Ca, Mg and Na in the plants at a fjaeldmark and two fernbrake communities are described. In general, N, P and K concentrations in the aboveground biomass decreased, and those of Ca (sometimes also Mg) increased as the season progressed. Exceptions to this pattern are discussed. Seasonal changes in nutrient concentrations in reproductive organs, roots, rhizomes and in the aboveground necromass (dead plant material) differed between species. N, P and K concentrations in living leaves of dicotyledonous species (and of the fern *Blechnum penna-marina,* which at the island behaves ecologically like a dwarf shrub) are similar to those for dwarf-shrubs at Northern Hemisphere tundra and tundra-like communities; in many instances the K concentrations are higher than for tundra species. Mg and Na levels in the island dicots are greater than those generally reported for tundra plants. Ca concentrations in all the island species considered in this study are markedly lower than for plants from tundra and tundra-like areas. There were no conspicuous seasonal variations in soil nutrient levels at the three island communities. (Auth.)

E-37351

Giret, A., **Geology of French austral islands** [Géologie des terres australes françaises], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.17-41, In French with English summary. 23 refs.

Geological and geomorphological features of the French Austral Antarctic Territories, including St. Paul, Possession, Amsterdam, Crozet and Kerguelen Islands, are discussed and illustrated. Pertinent literature is reviewed, including the islands' submarine characteristics, paleogeography, structural interpretation and chronologic evolution. The volcanic and plutonic rocks, the presence of dykes, sills, and ring complexes, as well as emanations of smoke and gas, and the occurrence of hot springs on many of the islands, attest to the islands' magmatic origins.

E-37352

Bougère, J., **Gravity stresses in subantarctic landscapes: preliminary observations on Possession Island, Crozet Islands (French Austral and Antarctic Territories)** [Les contraintes de gravité sur les paysages subantarctiques: observations préliminaires à l'Ile de la Possession, Archipel Crozet (Terres Australes et Antarctiques Françaises)], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.43-55, In French with English summary. 12 refs.

The influence of gravity stresses on subantarctic landforms is examined, using Possession I. as an example, from 3 points of view: geology, biology and climate. Morphological evidence of processes which shaped slopes, cliffs and ledges is presented in the form of illustrations and photographs. Two dominant environmental factors, the low temperature and high wind velocity affecting the vegetation's population and type distribution, are considered.

E-37353

Frenot, Y., **Soil characteristics and pedogenic processes of the fell-fields of Possession Island, Crozet Islands** [Caractéristiques des sols et processus pédogénétiques sur les fell-field d'une île subantarctique: l'Ile de la Possession, archipel Crozet], *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.57-72, In French with English summary. Refs. p.70-72.

Results of studies of fellfield soil on Possession I., Crozet archipelago, are presented. The major pedogenic factors at altitudes over 150 m above sea level, such as wind, rain, and frequent freeze thaw cycles, which are responsible for the desert ground and some microtopographic features of the surface—stone nests and soil stripes similar to the patterned ground of the Northern Hemisphere—are discussed. Structural phenomena are illustrated and show that the chemical weathering of basalt is very active, particularly by the presence of gypsite in fractions of clay.

E-37354

Bergstrom, D.M., **Evidence from fossils for uplift during the Holocene in Green Gorge, Macquarie Island,** *Comité national français des recherches antarctiques. CNFRA,* 1987 No.58, p.73-82, 26 refs.

Peat deposits from a mound in Green Gorge, a substantial valley on the east coast of Macquarie I., were studied. Both macro- and microfossils, in the form of seeds, fruits, pollen, animal hair and skin were preserved in the deposits. Analysis of both plant and animal fossils has revealed an interesting geomorphic history of the area. A succession from coastal vegetation with seal-disturbed sites to the herbfield vegetation types present on the sites today was recorded. This palaeorecord suggests that a major part of Green Gorge was an ocean inlet approximately 8,500 years ago and that since this time areas of the valley have been uplifted as a result of tectonic processes. An uplift rate of 3.3-4.3 m/1000 years was calculated. This study illustrates that a variety of fossil evidence can provide a much more secure conclusion than one based on a single line of analysis. (Auth.)

E-37374

Wade, F.A., Cathey, C.A., **Geology of the basement complex, western Queen Maud Mountains, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 36(15), p.429-453, 47 refs.

The basement complex in the Queen Maud Mountains in the vicinity of the Shackleton Glacier is composed of late Precambrian-Cambrian metasedimentary and metavolcanic rocks and the Ordovician plutons which constitute the Queen Maud Batholith. Three formations in the ancient metasedimentary rocks are identified: the Goldie, Greenlee, and Taylor formations. The metasedimentary rocks in the Ramsey Glacier portion of the surveyed area are correlated with the Goldie Formation of the Holland Range, Queen Alexandra Range, and Queen Elizabeth Range to the north and west. It is late Precambrian. The Greenlee Formation is composed of nearshore clastics and minor amounts of volcanics and marbles. The age is probably late Precambrian-Cambrian. It is correlated with the Duncan Formation to the east. The Taylor Formation is primarily volcanoclastics and marbles. The upper portion, at least, is correlated with the Shackleton Limestone to the west and the Fairweather Formation to the east. The Queen Maud Batholith in the surveyed area is composed of adamellites, granodiorites, granites, alaskites, and tonalites. Radiometric ages indicate intrusion during the Ordovician. (Auth.)

E-37405

Drago, E.C., **Limnological studies on Deception Island, South Shetland Islands: morphology and origin of lentic environments,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.193-205, 21 refs.

The geomorphological characteristics of 11 lentic environments on Deception I. are described. Some of the more important morphological parameters of the lakes and ponds are given, and their possible origins are discussed. These water bodies are associated with craters and minor cones and form a lacustrine system around the inner edge of the caldera. The cones range between 20 m and 100 m in height, and up to 500 m in diameter. They are of the pyroclastic type, being formed by volcanic ash, sand and lapilli, as well as by larger volcanic products such as scoria, boulders and magma bombs. These elements also make up the shores and basins of the lakes and ponds on the Island. The water bodies range in depth between 0.8 and 36 m. Some are permanent, with surface areas as large as 0.3 sq km, but others dry up completely before the beginning the antarctic winter. The surface levels of some are below sea level, while those in proximity of the sea exhibit a daily vertical oscillation related to the tidal regime. (Auth.)

E-37406

Kieffer, L.A., Copes, C.D., **Limnological studies on Deception Island, South Shetland Islands: chemistry of lentic environments,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1987 Vol.7, Antarctic aquatic biology. Proceedings of the Regional Symposium on Recent Advances in Antarctic Aquatic Biology with Special Reference to the Antarctic Peninsula Region, San Carlos de Bariloche, Argentina, June 6-10, 1983. Edited by S.Z. El-Sayed and A.P. Tomo, p.207-217, 24 refs.

The water chemistry of 11 lakes or ponds situated around the caldera of Deception I. was studies, as well as that of a coastal lagoon, a well at the Argentine station and the marine waters of Port Foster. A marine contribution index (IAM), Gibbs' diagrams and 2 dendrograms were constructed. They show a range of different biotopes: from those in which the dominant factor in ionic enrichment is principally of geochemical origin (approximately 70%) to those where the marine contribution is almost 100%. The water bodies were also ranked in 3 groups according to pH, relative depth, chemical oxygen demand (COD), orthophosphate and nitrate concentrations, and morphoedaphic index, thereby giving some indication of their probable productive capacity. (Auth.)

E-37483

Hirakawa, K., **Report on the geological, geomorphological and geodetic field party in the Sör Rondane Mountains, 1987 (JARE-28),** *Antarctic record,* Nov. 1987 31(3), p.206-229, In Japanese with English summary. 2 refs.

The JARE-28 carried out geologic, geomorphological and geodetic field work in the central part of the Sör Rondane Mountains for 35 days from Jan. 7 to Feb. 10, 1987. The field work was done in detail within the surveyed area of JARE-26 and -27. Thanks to the mobility of snowmobiles and good weather, almost all the expected investigations were conducted. In this report, the operation including logistics and the information on weather in the Mountains are mainly described, with a brief description of the geologic, geomorphological and geodetic field work. Two Belgian geomorphologists took part in this field work as exchange scientists and dealt with their own glaciological research project. (Auth.)

E-37484

Komura, K., Nakaya, S., Morimoto, T., Torii, T., **Activities of Japanese geochemistry party in the Dry Valleys region during the 1984-1985 field season,** *Antarctic record,* Nov. 1987 31(3), p.230-237, In Japanese with English summary.

In the 1984-1985 summer season, science activities of the Japanese geochemistry party are divided into two categories. The first one is the participation in the Cenozoic Investigations of the Western Ross Sea (CIROS) Project and the second the geochemical and environmental studies of the Dry Valleys region and the area near Scott Base on Ross I. Water samples, ground surface detritus and algae

were collected in this region from a limnological environmental point of view. The sampling was made mostly in the North Fork and South Fork and the Labyrinth area in Wright Valley. A NaI(Tl) scintillation survey meter was used to measure the environmental radiation level and a preliminary use of TLD (thermoluminescence dosimeter) was also made for monitoring the integral radiation dose. Concentrations of cosmic-ray induced Be-8 and natural Pb-210 in surface air were measured for air dust samples collected at Scott Base and CIROS-2 drill site. (Auth.)

E-37499

Lemoigne, Y., Torres, T., **Palaeoxylology of Antarctica: *Sahnioxylon antarcticum* n. sp. and interpretation of the double zonation in the growth-rings of the secondary woods of genus (parataxon) *Sahnioxylon* Bose and Sah, 1954** [Paléoxylologie de l'Antarctide: *Sahnioxylon antarcticum* n. sp, et interprétation de la double zonation des cernes des bois secondaires du genre de structure (parataxon) *Sahnioxylon* Bose et Sah, 1954], *Académie des sciences, Paris. Comptes rendus. Série II,* Apr. 7, 1988 306(13), p.939-945, In French with abridged English version. 9 refs.

A new species of fossil wood, *Sahnioxylon antarcticum* n. sp. collected from the Upper Cretaceous at Livingston I. is described and illustrated. The comparative study of the different species of the parataxon *Sahnioxylon* has permitted to recognize two very different periods of vegetation and their essential impact in the expression of the double zonation into growth-rings very typical of these secondary fossil woods of *Bennettitales.* (Auth.)

E-37501

Burckle, L.H., Gayley, R.I., Ram, M., Petit, J.R., **Diatoms in antarctic ice cores: some implications for the glacial history of Antarctica,** *Geology,* Apr. 1988 16(4), p.326-329, 37 refs.

The presence of reworked Pliocene and older marine microfossils in glacial tills of the Sirius Group suggests that these sediments were emplaced during the Pliocene or later by glaciers riding up the eastern slope of the Transantarctic Mountains. This interpretation implies that there was considerable fluctuation in the size of the east antarctic ice sheet as recently as ca. 3 Ma. An alternate scenario (eolian emplacement of the Pliocene microfossils) was tested by comparing diatoms in the Sirius Group with diatoms in Holocene and last glacial maximum ice from the Dome C core from the central Antarctic Plateau. Since the diatoms in Dome C ice are known to be eolian in origin, it was hypothesized that if the Sirius diatoms are also eolian, then these two antarctic sites, equally remote from the southern ocean, will have the same exotic flora (i.e., windblown diatoms from either a fresh-water or marine source). However, whereas the Dome C diatoms are predominantly fresh water, those of the Sirius are predominantly marine. It is concluded from these data that the Sirius and Dome C diatoms each reflect a different mode of emplacement and that the diatoms in the Sirius till were not emplaced via wind transport. (Auth.)

E-37502

Leg 119 Shipboard Scientific Party, **Early glaciation of Antarctica,** *Nature,* May 26, 1988 333(6171), p.303-304, 3 refs.

A report is presented by the thirty scientists from the international community comprising the Shipboard Party, giving brief descriptions of the contents and structural characteristics of sediments drilled in the Kerguelen Plateau and in Prydz Bay. The partially overconsolidated nature of Prydz Bay sediments indicates that they were repeatedly loaded, possibly by ice. Earliest geochronology of these sediments places a glacier complex in this region during the middle Eocene, about 42.7 Myr.

E-37515

Tokyo. National Institue of Polar Research, **Science in Antarctica, Vol.6: Antarctic meteorites** [Nankyoku no kagaku 6 Nankyoku inseki], Tokyo, Kokon Shoin, 1987, 440p., In Japanese. Refs. p.406-427.

This volume summarizes Japanese studies on antarctic meteorites since the early 70's. The introductory chapter discusses meteorites in general and their classification, followed by the exploratory history in the antarctic region by Japanese and other teams. Chap. 3 describes antarctic meteorites collected by Jan. 1986, approximately 7,500 out of which 5618 are controlled by NIPR. Chaps. 4-15 cover Japanese studies on antarctic meteorites. Topics include: processing of meteorites, the mechanism responsible for meteorite accumulation in Antarctica; iron meteorites and stone-iron meteorites; antarctic chondrites and achondrites; cosmogenic chemistry, isotopic chemistry and organic chemistry of antarctic meteorites; nuclides and terrestrial age of antarctic meteorites; reflection spectra and asteroid surface materials; magnetic and physical properties of antarctic meteorites; and contributions of antarctic meteorite studies to planetology. A bibliography of over 600 references, and subject and meteorite indexes complete the volume.

E-37517

Klein, E.M., **Isotope evidence of a mantle convection boundary at the Australian-Antarctic Discordance,** *Nature,* June 16, 1988 333(6174), p.623-629, 49 refs.

Basalts from the Southeast Indian Ridge south of Australia form two geographically and isotopically distinct groups that show affinities with either Indian Ocean or Pacific/Atlantic Ocean isotope compositions. The data raise the possibility that there is a sharp boundary between the Indian and Pacific Ocean isotope provinces. The isotope boundary occurs over less than 200 km within the Australian-Antarctic Discordance, a tectonically complex region believed to overlie a zone of downwelling mantle flow.

E-37519

Grikurov, G.E., **Antarctica** [Antarktida], Tektonika kontinentov i okeanov; ob"iasnitel'naia zapiska k Mezhdunarodnoĭ tektonicheskoĭ karte mira masshtaba 1:15,000,000 (Tectonics of continents and oceans; explanatory text to accompany the International Tectonic World Atlas, scale 1:15,000,000. Edited by IU.G. Leonov and V.E. Khain, Moscow, Nauka, 1988, p.148-158, In Russian. 21 refs.

This chapter deals with the bedrock complexes and with the mantle of the antarctic platform; the fold systems, including the Transantarctic Mountains, the Antarctic Peninsula, Marie Byrd Land, and Ellsworth Mountains; the younger platforms including structural units such as the Ross fold system of the Transantarctic Mountains, the West Antarctic fold system, the East Antarctic craton, the Beacon Group and the rift zones. These are described and relationships are established. The evolutionary stage boundaries for various geologic structures are given.

E-37520

Udintsev, G.B., **Atlantic Ocean** [Atlanticheskiĭ okean], Tektonika kontinentov i okeanov; ob"iasnitel'naia zapiska k Mezhdunarodnoĭ tektonicheskoĭ karte mira masshtaba 1:15,000,000 (Tectonics of continents and oceans; explanatory text to accompany the International Tectonic World Atlas, scale 1:15,000,000. Edited by IU.G. Leonov and V.E. Khain, Moscow, Nauka, 1988, p.166-196, In Russian. Refs. p.195-196.

Bathimetric and morphological features of the antarctic portion of the Atlantic Ocean, including the Weddell Sea basin and the conti-

nental shelf of Queen Maud Land, are briefly described on p. 194. Width, length and depth of separate areas are given, including the dimensions of the Ronne Ice Shelf and those of various islands.

E-37521
Milanovskiĭ, V.E., Neprochnov, IU.P., **Indian Ocean** [Indiĭskiĭ okean], Tektonika kontinentov i okeanov; ob"iasnitel'naia zapiska k Mezhdunarodnoĭ tektonicheskoĭ karte mira masshtaba 1:15,000,000 (Tectonics of continents and oceans; explanatory text to accompany the International Tectonic World Atlas, scale 1:15,000,000. Edited by IU.G. Leonov and V.E. Khain, Moscow, Nauka, 1988, p.196-213, In Russian. Refs. p.211-213.

Bathimetric, morphological and structural features of the 3 basin groups of the Indian Ocean are described on p. 202-211. They are the African-Antarctic group in the west, Crozet in the north and Australian-Antarctic in the east, separated by the Crozet Plateau and the Kerguelen Ridge, thus representing 5 basic morphostructural elements of the antarctic sector. The sea-floor spreading anomalies, the sediment distribution, and the crustal structure studies are reviewed and the evolution of the area is considered.

E-37522
Pushcharovskiĭ, IU.M., Khain, V.E., **Pacific Ocean** [Tikhiĭ okean], Tektonika kontinentov i okeanov; ob"iasnitel'naia zapiska k Mezhdunarodnoĭ tektonicheskoĭ karte mira masshtaba 1:15,000,000 (Tectonics of continents and oceans; explanatory text to accompany the International Tectonic World Atlas, scale 1:15,000,000. Edited by IU.G. Leonov and V.E. Khain, Moscow, Nauka, 1988, p.213-241, In Russian. 32 refs.

Description of the southern portion of the Pacific Ocean includes structural, tectonic, petrologic, bathimetric, morphological, and geochronological considerations of, among others, the Campbell Plateau, The Bellingshausen and Scotia basins, and the Drake Passage.

See also:
A-35145 A-35247 A-35326 A-35865 A-36146 A-36147 A-36525 A-37196 B-34936 B-35523 B-35526 B-35587 B-35613 B-35614 B-35645 B-35760 B-36043 B-36114 B-36329 B-36552 B-36619 B-36685 B-36727 B-36750 B-36788 B-36900 B-37104 B-37365 B-37415 B-37480 C-35216 C-35569 C-36068 C-36092 C-36184 C-36924 D-34755 D-35327 D-36084 F-34858 F-34893 F-35130 F-35249 F-35629 F-35748 F-35874 F-36287 F-36311 F-36341 F-36345 F-36346 F-36347 F-36348 F-36349 F-36587 F-36606 F-36719 F-36940 F-37079 F-37219 F-37273 I-36323 I-36412 J-35220 J-35349 J-35563 J-36470 J-36705 J-37281 J-37372 L-34681 L-34773 L-35038 L-35041 L-35170 L-35172 L-35338 L-35742 L-35780 L-35789 L-35866 L-35915 L-36086 L-36089 L-36090 L-36091 L-36159 L-36170 L-36171 L-36172 L-36173 L-36208 L-36304 L-36703 L-36715 L-36782 L-37344 L-37508 M-36148

F. ICE AND SNOW

F-34669

Kohnen, H., Lange, M., **Studying mass balance in the frontal zone of the Filchner-Ronne ice shelf, Antarctica** [Izuchenie balansa massy vo frontal'noĭ zone shel'fovogo lednika Fil'khnera-Ronne v Antarktide], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* July 1986 Vol.57, p.136-139, 251-254, In Russian and English. 8 refs.

Changes in position of the ice shelf front are analyzed for 1957-1984 and the shelf's mass balance is evaluated.

F-34702

Haeberli, W., comp, **Fluctuations of glaciers 1975-1980, Vol.IV,** Paris, UNESCO, 1985, 265p. + maps, Refs. passim.

Data on glacier variations reported from different parts of the world are compiled, tabulated, mapped and discussed. Those for 32 antarctic and sub-antarctic glaciers were submitted by T.J. Chinn of New Zealand and I. Allison of Australia. The glaciers are listed and show the glacier number, name, PSFG identifying number, latitude and longitude, classification, exposition of accumulation and ablation areas, maximum, median, and minimum elevation, total area in sq km, length from maximum to minimum elevation, and type of data. A variation table gives number, name, PSFG number, dates of first and last survey, and variations in the horizontal position of the glacier front expressed as the change in length between survey covering the years 1976, 1977, 1978, 1979, and 1980. The maps show glaciers in Norway, Switzerland, Austria, Germany, China, and Afghanistan.

F-34716

Nazintsev, IU.L., **Brine in sea ice and its effect on sea ice heat conductivity** [O vliianii rassola v morskom l'du na ego teploprovodnost'], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.78, p.107-115, In Russian. 6 refs.

Studies of thermal conductivity of sea ice at different temperatures and salinities, carried out during 1979/80 antarctic cruises of the ship *Mikhail Somov,* are discussed. Instruments and methods used are described, and results are presented in tables.

F-34718

Nazintsev, IU.L., Sedov, O.K., **Young sea ice as a platform for cargo unloading in Antarctica** [Ispol'zovanie molodogo l'da dlia razgruzki sudov v Antarktide], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.78, p.120-126, In Russian. 4 refs.

It is reported that in summer of 1978/79 the ice shelf conditions near Mirnyy Station did not permit the unloading of cargo, carried by the Soviet ship *Mikhail Somov,* on the shore. Instead, ice floats 20-30 cm thick and 150-200 m long were found on Mar. 27 and used, for nine working days, as platforms to transfer from ship to helicopter 350 tons of cargo, which was then transported to Mirnyy Station by air. Physical and mechanical properties of the young ice employed were studied, and methods and results are discussed.

F-34719

Sheremet'ev, A.N., **Measurements of glacier thickness and flow velocity along the traverse Mirnyy-Komsomolskaya-Dome B** [Izmerenie tolshchiny i skorosti dvizheniia lednikovogo pokrova v raĭone marshruta Mirnyĭ-Komsomol'skaia-Kupol "B"], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.78, p.127-132, In Russian. 3 refs.

Mathematical procedures are discussed which make it possible to calculate the thickness of the ice sheet, the rheological properties of ice, temperature and velocities in the glacier body, mass balance and configurations of the bed. The results are compared with data obtained during a traverse from Mirnyy Station to Dome B. The ice flow data, calculated and measured by radio echo soundings, confirm the reliability of the calculation technique.

F-34727

Dörr, R., **Time-dependent settlement behavior of foundations in antarctic snow, firn, and ice at Georg von Neumayer and Filchner Stations** [Zeitabhängiges Setzungsverhalten von Gründungen in Schnee, Firn und Eis der Antarktis am Beispiel der deutschen Georg-von-Neumayer- und Filchner-Station], *Ruhr-Universität Bochum. Institut für Grundbau, Wasserwesen, und Verkehrswesen. Schriftenreihe. Serie Grundbau,* May 1984 No.7, 124p., In German with English and French summaries. 50 refs.

Deformations of snow, firn or ice caused by external loads are time dependent because of the viscoelastic material behavior. Therefore settlement of structures must be expected during their lifetimes if the foundations influence these materials. This time-dependent settlement of shallow foundations at the two German antarctic research stations is measured and compared with calculations. The calculations use the compactive viscosity derived from the *in situ* depth-density curve to express the time-dependent deformation behavior. (Auth.)

F-34737

Buckley, R.G., Staines, M.P., Robinson, W.H., ***In situ* measurements of the resistivity of antarctic sea ice,** *Cold regions science and technology,* June 1986 12(3), p.285-290, 18 refs.

The resistivity of first year sea ice was measured *in situ* at two locations in McMurdo Sound, Antarctica using the Wenner array technique at audio frequencies. In addition, salinity and temperature profiles were measured. The results are adequately described by a three-layer model made up of a thin conducting surface layer, an insulating layer and finally sea water. The average resistivity of sea ice was found to lie in the range 50-200 ohm depending on salinity, structure and temperature. The resistivity and thicknesses of the surface layer could not be determined uniquely by the model but a maximum value for the resistivity as low as 4 ohm m was obtained. The resistivity of the surface layer was found to be influenced by the removal of the snow cover. The depth predicted by the Wenner sounding was found to be roughly 50% of the actual depth, a result that is consistent with a conductivity in the vertical direction and parallel to the brine channels of four times the conductivity in the horizontal direction within the bulk layer.

F-34741
National Research Council. Polar Research Board, **Recommendations for a U.S. ice coring program,** Washington, D.C., National Academy Press, 1986, 67p., Refs. passim.

The present ice coring program both in Antarctica and Greenland is reviewed and recommendations are made for improvements and expansion of the program. Reasons for scientific studies are discussed, ice core drilling and analysis techniques are assessed, and the logistics of the program are examined. Major elements of the U.S. program are shown, including requirements, capabilities, techniques, measurements, models, storage, interdisciplinary considerations and management, and international cooperation. Recommendations are made for the program and an action plan for implementing these recommendations is promulgated. Appendixes give insight to CRREL activity in deep drilling; international ice drilling technology; laboratory analysis of ice cores; the storage facility at SUNY Buffalo; and the motivation for CO2 research.

F-34750
Carsey, F.D., **Weddell-Scotia sea marginal ice zone observations from space, Oct. 1984,** *Journal of geophysical research,* Mar. 15, 1986 91(C3), p.3920-3924, 12 refs.

Imagery from the shuttle imaging radar-B experiment as well as other satellite and meteorological data are examined to learn more about the open sea ice margin of the Weddell-Scotia seas region. At the ice edge, the ice forms into bandlike aggregates of small ice floes similar to those observed in the Bering Sea. The radar backscatter characteristics of these bands suggest that their upper surface is wet. Further into the pack, the radar imagery shows a transition to large floes. In the open sea, large icebergs and long surface gravity waves are discernible in the radar images. (Auth.)

F-34767
Zhang, Q., **Sea ice observations and measurements at Davis, East Antarctica,** *Journal of glaciology and geocryology,* 1986 8(2), p.143-148, 5 refs., In Chinese with English summary.

Sea ice formation, breakup and physical features were observed from Jan. to Dec. 1981, along the coast at Davis Station. Changes of ice thickness and water temperature beneath the ice were measured. It was found that the ice begins to form in mid-Mar. and grows to its maximum thickness of 170 cm in Nov. The ice rapidly thickens at 10-12 cm/week in the first 3 weeks due to snow falling on the newly formed ice. Growth rate was 6.5 to 5 cm a week from Apr. to July, slowing down to 2-4 cm a week from Aug. to early Nov. Water temperature beneath the ice varied between -1.8 C and -2.6 C, dropping down to a minimum of -2.6 C from mid-Mar. to the end of May as air temperature fell. The ice grew rapidly in super-cold water at that stage. From Oct. to early Nov. the sea water temperature rose gradually and then the ice began melt. Sea ice in the vicinity of Davis is composed of 3 layers: the upper layer, about 80 cm thick, consisting of white cellular and laminar fine ice frozen and formed from Mar. to May; the middle layer, which is a uniform column fiber of frozen ice 80 cm thick, formed from June to Sep.; and the lower layer, about 10 cm thick, the bottom frozen ice mixed with diatom and alga. Sea ice breakup between the end of Nov. and early Dec. occurs suddenly, a direct effect of strong wind and wave, the rise of water temperature and ice melting being the basic cause. (Auth. mod.)

F-34781
Masuda, N., Harada, K., **Accumulation rate of Mizuho Station, East Antarctica: an application of the Pb-210 method,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.159-165, 20 refs.

The lead 210 method for dating was applied to firn samples collected from a 5-m pit at Mizuho Station by the 15th JARE. Two series of measurements were undertaken (Po-210 and Pb-210) producing snow accumulation rates estimated at 19 cm snow per year from the Po-210 profile and at 20 cm snow per year from the Pb-210 profile. The net accumulation rate was estimated at 7.8 g water per year assuming that the density was 0.4 g per cc. These values agreed well with the results of previous studies. The lead 210 method could be applied to estimate snow accumulation rate within an error of 10% as two sigma. (Auth.)

F-34840
Karachenov, A.T., **Model of Pleistocene glaciation of the system "glaciers-ocean-troposphere-asthenosphere"** [Model' pleĭstotsenovykh oledeneniĭ sistemy "ledniki-okean-troposfera-astenosfera"], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Apr. 1986 No.56, p.38-45, 18 refs., In Russian with English summary.

A new model of Pleistocene glaciations is advanced. The following features have been introduced: equation for the mean altitude of the glacier surface has been obtained; a quasi-stationary condition has been applied to the "transport" model of a non-stationary glacier and the formula was introduced for complete ablation, caused by ice flow; on the basis of the linearized empirical formula by V.G. Khodakov a new relationship was introduced for the thermal component of ablation field, which depends on the number of glaciers as the main function of their area; a new relationship for the number of glaciers has been advanced as a smoothed function of their area. Computerized modelling shows that the new model describes more adequately the evolution of Pleistocene glaciations. (Auth. mod.)

F-34841
Miagkov, S.M., **Basic causes of the development of polar continental glaciations** [Osnovnye prichiny razvitiia poliarnykh kontinental'nykh oledeneniĭ], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Apr. 1986 No.56, p.87-90, 7 refs., In Russian with English summary.

Reconstruction of conditions favorable for continental glaciations during the last 650 million years shows that they occurred in periods when the continent was in the polar position and was dry. These same conditions led to the beginning of the present-day antarctic glaciation, the dimensions of which depended on ocean level fluctuations. Partial time coincidence of changes in the dimensions of the ice sheet and ocean currents is explained by their dependence on the common tectonic agents. Periods in the changes of antarctic glaciation for the last 100 mill years are distinguished on the basis of the ocean level fluctuations. (Auth.)

F-34842
Glazovskiĭ, A.F., **Glacial erosion in western Antarctica** [Lednikovaia eroziia v Zapadnoĭ Antarktide], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Apr. 1986 No.56, p.135-139, 11 refs., In Russian with English summary.

The data of Metcalf's and Boulton's models are used to assess subglacial abrasion along the Pine Island Glacier—ice stream B profile. The maximum abrasion zones are 120-180 km and 200-360 km upstream from the grounding lines of the outlet glacier and ice stream, respectively. Maximum abrasion rate is 18.4 mm/a from Boulton's model curve, and 0.9 mm/a from Metcalf's model curve (on basaltic bedrock). These zones are caused by dynamic peculiarities of glaciers interacting with the ocean: increase of sliding velocity and decrease of effective normal stress and basal shear stress towards the grounding lines. The maximum abrasion pattern explains the forma-

tion of the overdeepening basins and the rock bars in glacial troughs on the continental margins. (Auth.)

F-34858

Gaudichet, A., Petit, J.R., Lefèvre, R., Lorius, C., **Investigation by analytical transmission electron microscopy of individual insoluble microparticles from antarctic (Dome C) ice core samples,** *Tellus,* July-Sep. 1986 38B(3-4), p.250-261, 47 refs.

The aim of the study was to identify the mineralogy of dust and investigate the geographic location of sources and their variations with time. It is confirmed that microparticles have mostly a terrigenous (eolian) origin as revealed by identification of various clays (mostly illites), quartz and feldspars in 6 ice samples. Except for some products attributed to volcanic activity, the mineralogy of particles appears to be randomly mixed and shows no significant change nor particular signature of a specific source over the studied period. However, kaolinite, considered to be a tracer of low latitude dust source areas, was too low in content to suggest that the tropical area was a main source of Dome C dust over the period studied. (Auth.)

F-34859

Neftel, A., Jacob, P., Klockow, D., **Long-term record of H2O2 in polar ice cores,** *Tellus,* July-Sep. 1986 38B(3-4), p.262-270, 32 refs.

At Dye 3 and Camp Century, Greenland, and at Byrd Station ice cores were drilled to bedrock. They offer an archive of solid precipitation over the last 50,000 to 100,000 years. H2O2 is one of the dominant trace components in the ice. A survey of the H2O2 levels in the three deep cores is presented. In the Greenland ice cores the H2O2 level decreases with increasing depth and is extremely low during the last glaciation. In the Byrd core an H2O2 concentration spike is observed in the time period 6000 to 12,000 years before present. Possible explanations for the decreasing trend with age and depth and the drop during the Ice Age are discussed. (Auth.)

F-34864

Blankenship, D.D., Bentley, C.R., Rooney, S.T., Alley, R.B., **Seismic measurements reveal a saturated porous layer beneath an active antarctic ice stream,** *Nature,* July 3-9, 1986 322(6074), p.54-57, 18 refs.

Seismic reflection studies recently conducted on ice stream B, part of the marine ice sheet of West Antarctica, show a meters-thick layer immediately beneath the ice in which both compressional and shear wave speeds are very low. These low wave speeds imply that the material in the layer is highly porous and is saturated with water at a high pore pressure. From this, and from arguments presented in an accompanying paper to the effect that the layer would be too weak to support the shear stress exerted by the overlying ice, it is concluded that the layer is deforming and that the ice stream probably moves principally by such deformation. (Auth.)

F-34865

Alley, R.B., Blankenship, D.D., Bentley, C.R., Rooney, S.T., **Deformation of till beneath ice stream B, West Antarctica,** *Nature,* July 3-9, 1986 322(6074), p.57-59, 27 refs.

The behavior and possible instability of the West Antarctic ice sheet depend fundamentally on the dynamics of the large ice streams which drain it. Model calculations show that most ice-stream velocity arises at the bed, and radar sounding has shown the bed to be wet, but the basal boundary condition is not well understood. Seismic evidence from the Upstream B camp (UpB) on the Siple Coast of West Antarctica shows that the ice stream there rests on a layer of unconsolidated sediment averaging 5 or 6 m thick, in which the water pressure is only about 50 kPa less than the overburden pressure. Because this thin layer occurs well inland beneath an active ice sheet and rests on a surface showing flutes characteristic of glacial erosion, it is presumed that it is glacial till. It is proposed here that deformation within the till is the primary mechanism by which the ice stream moves, and implications of this hypothesis are discussed. (Auth.)

F-34892

Delmas, R.J., **Antarctic precipitation chemistry,** *NATO advanced Study Institute series. Series G: Ecological sciences,* 1986 Vol.6, Chemistry of multiphase atmospheric systems. Edited by W. Jaeschke, p.249-266, Refs. p.265-266.

DLC QC879.6.N38

Several thousand snow samples collected at various antarctic locations have been analyzed after melting by ion chromatography and acid base titrimetry in order to obtain the chemical composition of past and present antarctic precipitation. In particular the ionic balance of major impurities has been obtained for many samples. The concept of ionic budget is presented along with the way to calculate it and the various parameters which are involved, with special attention paid to acidity. The calculations are illustrated by results obtained at five selected antarctic sites (South Pole, Dome C, Vostok, D 57 and James Ross Island), and for various time periods (from the present back to the last glaciation). The predominant role played by gas-derived atmospheric acids (H2SO4, HNO3 and HCl) is emphasized. (Auth.)

F-34893

Gordon, J.E., Hansom, J.D., **Beach forms and changes associated with retreating glacier ice, South Georgia,** *Geografiska annaler. Series A Physical geography,* 1986 68A(1-2), p.15-24, 14 refs.

Beach forms associated with the retreat of Cook Glacier, between 1975 and 1982 are compared with those found on polar beaches. The presence of certain characteristics but the absence of many others diagnostic of polar beaches distinguishes Cook beach as a sub-polar feature. Evidence from Neoglacial moraines and raised beach deposits indicates that former positions of Cook Glacier have controlled beach location but that the preservation of Neoglacial beaches depends on isostatic recovery outpacing beach reworking. At Cook beach the occurrence of glacial till overlying beach deposits adjacent to beach deposits overlying glacial till indicates the type of complex stratigraphy that may be present in Quaternary deposits from tidewater glacier environments. (Auth.)

F-34900

Jacobs, S.S., **Polar ice sheets: a wild card in the deck,** *Oceanus,* Winter 1986/87 29(4), p.50-54, 7 refs.

The problem is addressed of a sudden global rise in sea level with the surging of antarctic ice sheets. Aspects of the problem such as recent sea level rises, atmospheric warming, the condition of ice sheets in West Antarctica, stability of ice shelves, and the mass budget of Antarctica, are discussed. Models are fine but to play the game right there must be many continuous, accurate measurements to monitor ice sheet margin changes which may develop.

F-34919

Dieckmann, G., Hemleben, C., Spindler, M., **Biogenic and mineral inclusions in a green iceberg from the Weddell Sea, Antarctica,** *Polar biology,* 1987 7(1), p.31-33, 8 refs.

Samples of a green iceberg, sighted near Kapp Norvegia in the Weddell Sea on Feb. 16, 1985, were analyzed. The iceberg was drifting and protruded approximately 10 m above the sea surface. It is suggested from its appearance that it had been thoroughly flushed and had subsequently capsized. A 20 kg block was chipped off the iceberg with a pickaxe. The color of the block changed from green to a translucent white upon separation from the iceberg. It is assumed that iron, copper and other metallic compounds were responsible for

the green color and it is concluded that the color was not of biological origin. (Auth.)

F-34971

Zeller, E.J., Dreschhoff, G.A.M., Laird, C.M., **Nitrate flux on the Ross Ice Shelf, Antarctica, and its relation to solar cosmic rays,** *Geophysical research letters,* Nov. 1986 13(12), p.1264-1267, 23 refs.

Nitrate flux has been determined in the snow sequence deposited at Windless Bight on the Ross Ice Shelf. The data were obtained from on-site analysis of nitrate concentrations from a glaciological pit and a firn core spanning the time interval from midwinter 1971 to Jan. 1986. The high resolution data can be combined with precipitation records collected from adjacent areas to provide a record of nitrate flux. The resulting time series contains a signal which corresponds to the two major solar events of 1972 and 1984. The concentration and flux profiles may be useful in studies of antarctic ozone depletion. (Auth.)

F-35023

Pyne, S.J., **The ice: a journey to Antarctica,** Iowa City, University of Iowa Press, 1986, 428p., Bibliography p.393-411.

DLC G860.P96 1986

An elegant philosophical, historical, scientific review is presented of the progress and current state of Man's knowledge of antarctic ice in its many forms. Relationships between the forms are established and a mood of continuing wonderment prevails throughout the work because the antarctic ice is everywhere dominant, all pervasive, overwhelming. Individual essays and chapters regale us on bergs, pack, exploration, shelf, literature and art, glaciers, earth sciences development, sheet, and the ice source. Two quotations are necessary to demonstrate the strength and richness of the prose. Witnessing the winter solstice at Ice Dome C the author describes it: "The scene dereifies into infinitesimal specks of ice, a cloying mist of diamond dust suspended formlessly in a black box." And his dedication: "To Sonja who saw the future where I saw only the past."

F-35027

Enting, I.G., Mansbridge, J.V., **Effective age of bubbles in polar ice,** *Pure and applied geophysics,* 1985 Vol.123, p.777-790, 15 refs.

A mathematical description of the trapping of air bubbles in polar ice is analyzed in order to assist in the interpretation of measurements of anthropogenic constituents which have recently increased on time scales comparable to the firn closure time. The effective age of a layer of ice is defined in terms of the time at which the atmospheric concentration of a constituent was equal to the mean concentration for bubbles found in that layer. Under the assumption of uniform snow deposition at a particular site, the effective age is found to be the same for all constituents that vary linearly throughout the trapping period for a layer. Using a trapping distribution based on theoretical and observational studies, the corrections for non-linearity are found to be small for typical anthropogenic constituents. This property makes it possible to use smoothly increasing tracers such as the chlorofluorocarbons to determine the effective age empirically, even though it is an extremely poorly-conditioned problem to determine the entire trapping time distribution function by inversion of tracer concentrations. Much of the material used for this study was based on measurements made in Antarctica. (Auth. mod.)

F-35040

Shibuya, K., **Glacio-geophysical implication of an NNSS positioning in and around Syowa Station, East Antarctica,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.327-346, Refs. p.345-346.

Utilization of the two-wave NNSS receiver drastically improved the positioning accuracy on the ice sheet, giving 3 m three-dimensional convergence with 25 accepted satellite passes, and is most useful for the measurement of ice flow velocity. The flow velocity vectors along Route S-H-Z on Mizuho Plateau were obtained by estimating positional change of glaciological traverse stations after 7 years' interval. The obtained flow velocity is 15 m/a at H17 around 1000 m a.s.l. and 70 m/a at Z2 around 2000 m a.s.l. The obtained velocity vectors are found to be mostly parallel to the maximum slope of the free-air gravity anomaly contours and can be interpreted as the ice sheet sliding down the slope of the subglacial mound of 2400 m relative height from the average subglacial bedrock topography. If such bedrock sliding occurs over the whole region of Mizuho Plateau, the related thinning of the ice sheet may be detected by the precise measurement of the height change of the same marker station. By dynamically modeling the ice sheet and substituting the observed parameters such as precipitation, principal strain rate, etc., into the equation of ice thickness change, a submergence velocity of around -1 m/a is expected and will be detected by carefully designed repetitive NNSS receiving experiments after several years' interval. (Auth. mod.)

F-35064

U.S. Naval Polar Oceanography Center, **Antarctic ice charts 1983-1984,** Washington, D.C., 1985, 125p. ADA-159 907.

This publication is the sixth in a continuing bi-yearly series of antarctic sea ice atlases prepared in the Joint Ice Center at the Naval Polar Oceanography Center, Suitland. The Atlas contains weekly charts depicting Southern Hemisphere ice conditions and extents. The information presented was prepared principally from satellite imagery supplemented by conventional observations. Table 1, located on the inside back cover, summarizes satellite data availability for 1983 and 1984.

F-35066

Thomas, R.H., **Observing the polar regions from space,** *International Society for Optical Engineering. Proceedings,* 1984 Vol.481, p.165-171, 10 refs.

DLC G70.4.R43

Satellite remote sensing gives information on many aspects of the ice cover; sea-ice extent and physical characteristics; detailed images of ice floes and open-water leads within the ice pack; sea-ice movement; zones of summer melting and snow-accumulation rates on the continental ice sheets; accurate estimates of ice-surface elevation, and detection of zones on the ice sheet that are either thickening or thinning; accurate, all-weather mapping of ice coastlines and large crevasses, and estimates of ice discharge rates from the ice sheets. The type of instrumentation used is briefly discussed and some sample records are shown. (Auth. mod.)

F-35077

Zemtsov, A.A., Kudriashov, B.B., Chistiakov, V.K., Shkurko, A.M., **Borehole gas sampler for determining absolute age of ice by carbon isotope analysis** [Skvazhinnyĭ gazovyĭ probootbornik dlia izucheniia absoliutnogo vozrasta ledovykh tolshch s pomoshch'iu izotopnogo uglerodnogo analiza], *Antarktika; doklady komissii,* 1984 No.23, p.72-78, In Russian. 4 refs.

DLC G576.A65

Field work and experimental investigations are discussed concerning a borehole gas sampler used in arctic and antarctic glacier ice for the determination of absolute age of the various ice layers by radioisotope analysis. The borehole and the apparatus are described and illustrated.

F-35078

Aver'ianov, V.G., Korotkevich, E.S., **Antarctic ice sheet studies: results and plans** [Issledovaniia lednikovogo pokrova Antarktidy (itogi i plany)], *Antarktika; doklady komissii,* 1984 No.23, p.79-85, In Russian.

DLC G576.A65

Ice cover investigations, from the IGY until the present, are reviewed, and morphometric data on the ice sheet and ice-formation regions are presented. Moisture-balance and energy-exchange studies are included. New investigation methods, and some results, are also discussed, including the glaciological engineering field and the international cooperation among glaciologists. Plans for future studies are briefly outlined.

F-35079

Krass, M.S., **Model calculation of glacial evolution** [Model'nye raschety evoliutsii oledeneniĭ], *Antarktika; doklady komissii,* 1984 No.23, p.86-103, In Russian. 26 refs.

DLC G576.A65

A numerical model of glacial evolution is presented which permits to calculate climatic and geothermal effects on glaciation dynamics. New qualitative principles of ice cover expansion and degradation are obtained, and the reactions of ice sheets to climatic fluctuations are investigated. The interpretation of calculated results is applied to contemporary, as well as quaternary, glaciation.

F-35100

Urabe, N., Inoue, M., **Mechanical properties of antarctic sea ice (II),** International Offshore Mechanics and Arctic Engineering Symposium, 6th, Houston, Texas, Mar. 1-6, 1987. Proceedings, Vol.4, New York, American Society of Mechanical Engineers, 1987, p.239-244, 8 refs.

Succeeding to the 25th mission, the 26th mission collected sea ice samples from a land-fast 140 cm thick ice sheet at Lützow-Holm Bay in the Antarctic, and delivered them to Tokyo. Distributions of salinity, air content, density and fabric structure were examined along the thickness of the ice sheet. Mechanical properties such as uniaxial compressive strength, shear strength and mode II fracture toughness were measured for a wide range of loading rate at -10 C.

F-35102

Whillans, I.M., **Force budget of ice sheets,** Dynamics of the west antarctic ice sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.17-36, Refs. p.34-36.

Data relating to the stresses driving and resisting the flow of the west antarctic ice sheet are discussed. The driving stress is readily calculated and it shows an almost exponential decrease from the inland ice, along Ice Stream B, and across the Ross Ice Shelf to the calving edge. Prior work shows that basal drag restrains inland ice and that the backstress on ice shelves originates at islands, shoals, and the sides. The restraints on ice streams are not at present known, but basal drag, side drag, and back-pressure from the interstream ridges where the inland ice funnels into ice streams, are potential controls. (Auth. mod.)

F-35103

Goldschmidt, A., **Morphological and chemical data on microparticles in antarctic snows,** *Canadian mineralogist,* Mar. 1986 24(1), p.99-103, With French summary. 5 refs.

The morphology and chemical composition of microparticles left after the slow evaporation of samples of antarctic snow were studied. These samples were collected in a stratigraphic well located on the Antarctic Peninsula. Electron-microprobe analyses show the presence of Si, Ti, Al, Fe, Mg, Ca, Na, K, P, C, Pb, N, O, S and Cl. Zeolites, clay minerals, olivine, amphibole, calcium sulfate, organic substances and marine salts were identified by scanning-electron microscopy. The presence of these particles is due to an eolian mode of transportation. (Auth.)

F-35120

Ivey, J.P., Davies, D.M., Morgan, V., Ayers, G.P., **Methanesulphonate in antarctic ice,** *Tellus,* Nov. 1986 38B(5), p.375-379, 14 refs.

Methanesulphonate was investigated as a potential contributor to the sulphur budget and to the acidity of antarctic ice from Law Dome (66.5 S, 113.0 E). The anion was found to be present at a mean concentration of 0.08 micro eq/l and ranged between 0.006 and 0.28 micro eq/l. Although methanesulphonate was only a minor anion in comparison with chloride and sea salt sulphate, it was comparable with nitrate and excess sulphate. The concentration of methanesulphonate in the ice did not correlate significantly with excess sulphate nor was there a simple seasonal dependence such as is found for non-sea salt sulphate. (Auth.)

F-35127

De Angelis, M., Barkov, N.I., Petrov, V.N., **Aerosol concentrations over the last climatic cycle (160 kyr) from an antarctic ice core,** *Nature,* Jan. 22-28, 1987 325(6102), p.318-321, 25 refs.

Time series, covering more than 150,000 years for dust and marine salt loadings in the antarctic atmosphere, have been constructed from measurements of concentrations of aluminum and sodium in an ice core taken from East Antarctica. They exhibit an inverse correlation with delta 0-18 measurements. This work represents the first detailed study of marine and continental inputs over Antarctica since the end of the penultimate glacial age. The results extend understanding of aerial transport processes during the last glacial cycle. (Auth. mod.)

F-35130

Suetova, I.A., **New evaluation of the average height, volume and thickness of the antarctic ice sheet** [Novye otsenki sredneĭ vysoty, ob"ema i moshchnosti l'da Antarktidy], *Akademiia nauk SSSR. Doklady,* 1986 291(1), p.217-220, In Russian. 8 refs.

Area, volume and average height of Antarctica with the ice sheet, with and without shelf ice, with sea level as the base surface; area, volume and average height, or depth, of the antarctic continent without the ice cover; and volume and thickness of the ice alone are discussed and tabulated, showing that the ice volume is 1.5 million cu km with an average thickness of 120 m.

F-35132

Zotikov, I.A., **Thermophysics of glaciers,** Dordrecht, Holland, D. Reidel Publishing Co., 1986, 275p., For Russian original see 37-762 or 13F-27299. 139 refs.

The book consists of results of long-standing study on thermophysics of ice sheets and glaciers, dealing mainly with the heat regime models and numerical methods describing basic processes which rule the behavior of glaciers. The methods are used for heat regime analyses of the ice sheets, mountain glaciers and ice shelves. Results include formulas for engineering calculations. A number of sections discuss antarctic ice and other conditions; of particular interest is Ch. 7, in which the heat balance of antarctic ice masses is considered in some detail.

F-35193
Bentley, C.R., Shabtaie, S., Schultz, D.G., Rooney, S.T., **Continuation of glaciogeophysical survey of the interior Ross Embayment: summary of 1984-1985 field work,** *Antarctic journal of the United States,* 1985 20(5), p.63-64.

Surveys reported were carried out from two base camps: Crary Ice Rise and upstream B using a *Twin Otter* equipped with radar and seismic and gravity measuring gear. These programs are described and a chart showing survey tracks is included. Additionally, 8 to 10 m ice cores were collected from 17 stations and station positioning measurements for 29 stations were recorded.

F-35194
Alley, R.B., Bentley, C.R., **Firn studies at upstream B, West Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.65-66, 4 refs.

Descriptions are given of ice cores recovered at upstream B on Siple Coast. Firn density was measured and thin sections were prepared and photographed in the field. These will form the basis for detailed analyses since the core was partially melted during transit. An important analytical result showed that firn grain size is strongly dependent on the measuring method used; so to be meaningful, reports of grain size must be accompanied by descriptions of the methods used. Additional significant results are noted: grain size remains almost constant between the 3 and 26 m depths and above the 10 m depth firn shows a very strong vertical shape fiber.

F-35195
Grootes, P.M., Stuiver, M., **Land-ice/sea-ice transition in Ross Ice Shelf ice at J-9, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.66-68, 13 refs.

The study was made from the lower part of the J-8 ice core near the bottom of Ross Ice Shelf. Details of the analytical methods and results are described. The change in O-18 values between land ice and sea ice dating from the last glacial period is quite sharp. At 5.860 m above the bottom of the shelf ice, sea ice constitutes more than 97% of the ice mass; at 6.005 m the percentage drops to 1%. Comments are made on the capacity of sea water to penetrate the ice at a depth 6 m above the bottom of the shelf, ice growth rate, and mixing of meltwater with sea water.

F-35196
Laird, C.M., Zeller, E.J., Dreschhoff, G.A.M., Armstrong, T.P., **Nitrate variability in South Pole and Ross Ice Shelf snow and firn,** *Antarctic journal of the United States,* 1985 20(5), p.68-69, 5 refs.

The study sought to gain enough nitrate deposition data to analyze the concentration for variance within single-year layers. Analyses were made on site, usually within a few minutes after collection. The analysis of variance indicates that nitrate concentration within yearly layers is significantly less than the average variance between yearly layers, indicating a systematic and distinguishable variation through time. Some of the highest concentrations were found on sastrugi. There were also strong peaks of nitrate concentration associated with summer depositions and lower values during winter. Nitrate flux varies widely throughout the year but peaks in the winter months.

F-35197
Fireman, E.L., **Uranium-series dating of Allan Hills ice,** *Antarctic journal of the United States,* 1985 20(5), p.70-71, 7 refs.

Uranium-238 decay-series nuclides dissolved in antarctic ice samples were measured. Ice from the Cul de Sac site which has a high concentration of fine volcanic glass shards, has high radium-226, thorium-230, and uranium-234 activities but low uranium-238 activities compared to antarctic ice samples without volcanic shards. The radium-226, thorium-230, and uranium-234 excesses are in proportion to the shard content. The uranium-238 decay-series results are consistent with the idea that alpha decay products recoiled into the ice from the fine shards. Using this type of dating, it was determined that the age of the Cul de Sac ice is 220,000 years.

F-35198
Mayewski, P.A., Lyons, W.B., **Using an ice core to characterize the climatic history of Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.71-72.

Between 20 Nov. and 14 Dec. 1984, a remote tent camp was operated in the Dominion Range on an ice-covered massif located at the confluence of the heads of the Beardmore and Mill Glaciers in the Transantarctic Mountains. The main task at the site was to retrieve an ice core from which chemical and physical time-series will be made available to help in assessing: (1) current stability of the east antarctic ice sheet, (2) current models concerning the recent glacial history of the Transantarctic Mountains, (3) the presence of relatively high frequency climatic signals, and (4) the possible relationships between volcanic and/or solar activities and climatic change. Shallow snowpits were dug at several sites around the drill site, a 6-m snowpit was dug immediately adjacent to the drill site, and fresh and old surface snow samples were collected throughout the study area. The snowpits will provide samples that can be used to calibrate chemical analyses, to replicate studies, to assess seasonal signals in the chemical species and to collect other data sets including a temperature profile, density, and stratigraphy.

F-35200
Lorius, C., **International antarctic glaciological program activities at South Pole Station and Vostok,** *Antarctic journal of the United States,* 1985 20(5), p.73-74, 3 refs.

The South Pole Station work consisted mainly of the recovery and processing of samples from an electromechanical drill hole 143 m deep, drilled the previous season. The field work also included the recovery of the French deep-drilling ("climatopic") equipment previously tested at South Pole Station. The work in Vostok, performed in cooperation with Soviet scientists, consisted mainly of surface sampling from pits and shallow cores and of processing samples from a 2,083-m deep ice core obtained by Soviet scientists the previous seasons.

F-35201
Yuen, D.A., Schubert, G., Saari, M.R., **Shear heating instabilities of large ice sheets,** *Antarctic journal of the United States,* 1985 20(5), p.74-75, 2 refs.

Motions of large ice sheets represent an intrinsically thermomechanical problem, because the shear-deformation of ice is strongly controlled by its temperature-dependent rheology. Accordingly, viscous dissipation can play an important role modifying the movement of ice sheets. The present research efforts are concerned with understanding the nonlinear, thermomechanical responses of large ice sheets to different types of perturbations. In particular, the focus is on quantifying the timescales for the nonlinear growth of shear-heating instability involving thickened ice layers due to sudden climatic deterioration or the climatic warming associated with the Holocene glacial epoch and the increase of atmospheric CO2 in the last 100 years.

F-35219
Golosov, V.V., **Ice dynamics in the Weddell Sea, 1980** [Dinamika ledovogo pokrova moria Ueddella na protiazhenii 1980 goda], *Leningrad. Universitet. Vestnik. Seriia 7 Geologiia, Geografiia,* Mar. 1986 No.1, p.103-108, In Russian. 7 refs.

On the basis of satellite data on ice conditions in the Weddell Sea in 1980, the yearly cycle of ice formation, distribution and breakup is discussed. Illustrations of ice cover variations, over the period Jan.-Mar., Aug., Nov. and Dec. 1980, and Jan. 1981, show, among others, the ice minimum on Feb. 24, the polynya approaching Larsen Ice Shelf on Mar. 11, and the drift-ice area on Aug. 31.

F-35244

Petit, J.R., Duval, P., Lorius, C., **Long-term climatic changes indicated by crystal growth in polar ice,** *Nature,* Mar. 5-11, 1987 326(6108), p.62-64, 32 refs.

The reconstruction of palaeotemperatures from polar ice samples is essentially based on the isotopic composition of the ice. In this paper, a new and independent way is proposed to obtain such data by using crystal-size-change profiles. Dome C and Vostok ice cores data suggest the crystal growth rate is mainly driven by a built-in "memory" of the surface temperature conditions at the time of deposition. A semi-empirical model of crystal grain growth is proposed, leading to Last Glacial Maximum-Holocene temperature change estimates in good agreement with isotope interpretations. However, the possible palaeoclimatic application of this model suffers some limitations connected in particular with *in situ* strain conditions. (Auth.)

F-35249

Kennett, J.P., Hodell, D.A., **Major events in Neogene isotopic records,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.497-498, 19 refs.

Changes in oxygen isotopic ratios of foraminiferal calcite during the Cainozoic have been one of the primary tools for investigating the history of Arctic and Antarctic glaciation, although interpretations of the oxygen isotopic record differ markedly. The ambiguity in interpretation results mainly from the partitioning of temperature from ice volume effects in *delta*O-18 changes. Oxygen isotopes do not offer a unique solution for either temperature or ice volume. Climatic changes and events with a variety of core material from the South Atlantic and southwest Pacific oceans were investigated. Over 900 oxygen isotopic analyses were performed on samples of foraminiferal calcite from Neogene sections of DSDP Leg 90, southwest Pacific. The southwest Pacific data are supplemented by about 500 analyses from South Atlantic core material of latest Miocene and Pliocene age. This composite data set represents one of the most complete available with which to evaluate the evolution of glaciation during the Neogene. (Auth. mod.)

F-35252

Anderson, J.B., **Critical evaluation of some criteria used to infer Antarctica's glacial and climatic history from deep-sea sediments,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.503-505, 30 refs.

An evaluation is made of some of the assumptions used in interpreting the deep-sea sedimentary record, assumptions that are not always consistent with modern glacial and oceanographic concepts. Those criteria which are most often used to interpret the deep-sea sedimentary record of the southern ocean include downcore changes in the concentration of ice-rafted debris (IRD), microfossil assemblages, oxygen and carbon isotopes, grain size parameters, and the occurrence of hiatuses in the sedimentary record. In this paper the concentration is on sedimentary parameters used for palaeoceanographic/palaeoclimatic studies: IRD content and sedimentary hiatuses. (Auth. mod.)

F-35256

Denton, G.H., Hughes, T.J., **Potential influence of floating ice shelves on the climate of an ice age,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.509-513, 31 refs.

It is argued that floating ice shelves were important feedback factors in producing ice-age palaeoclimates in both polar hemispheres. In the Northern Hemisphere they would have added to the effects of continental ice sheets. Antarctic ice shelves would have been the major fcedback mechanism that drove ice-age climates in the Southern Hemisphere in near-synchrony with those in the Northern Hemisphere. (Auth.)

F-35274

Schlatter, R.P., **Iceberg sightings during SIBEX-2, Chile, in Bransfield Strait, 1985** [A vistamiento de témpanos durante SIBEX-Fase II, Chile, en el estrecho Bransfield, 1985], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.89-93, 5 refs., In Spanish with English summary.

Icebergs were counted during SIBEX-2, 1985, according to instructions of the Norsk Polarinstitutt aboard the *M/N Alcazar.* A total of 196 hours of iceberg counts revealed a larger concentration on the SE part of the Bransfield Strait. These results agree with the physical oceanographic pattern of that antarctic sector; but more observations are needed to find the causes of their drift and aggregations. (Auth.)

F-35296

Pyne, A.R., **Sea ice operation: McMurdo Sound-Granite Harbour,** *New Zealand antarctic record,* 1986 7(2), p.5-13, 2 refs.

The New Zealand Antarctic Research Programme (NZARP) operates a variety of vehicles on annual fast ice in McMurdo Sound. This article presents and discusses an ice thickness table for these vehicles, procedures for measurement of ice thickness and ice cracks and location of cracks, tide cracks and the transition from sea ice to coast (land or non-floating ice), as well as surface melting. (Auth.)

F-35322

Raisbeck, G.M., **Evidence for two intervals of enhanced Be-10 deposition in antarctic ice during the last glacial period,** *Nature,* Mar. 19-25, 1987 326(6110), p.273-277, 23 refs.

This is a follow-up study of previously reported concentration profiles of cosmic ray produced (cosmogenic) Be-10 in deep ice cores from Dome C and Vostok Station. In both these cores, a concentration of Be-10 was found approximately 2 times larger in ice from the late glacial period than in the Holocene ice. This was interpreted as probably resulting from a lower precipitation rate on the antarctic plateau during glacial periods, compared to interglacial periods. In the Vostok profile there was one sample, corresponding to about 60,000 yr BP, which gave an unusually large Be-10 concentration, not correlated with any obvious climatic event. It is suggested that this sample might be reflecting increased Be-10 production, as for example during a period of reduced solar modulation. A much more detailed concentration profile for Be-10 was measured in the present study in the Vostok core. The results confirm a Be-10 "peak", lasting about 1,000-2,000 years at about 60,000 yr BP, and show another similar peak at about 35,000 yr BP. The latter peak was also observed in the Dome C core. Possible sources for these peaks, and their potential as stratigraphic markers, are discussed. (Auth. mod.)

F-35351

Zotikov, I.A., Jacobs, S.S., **Oceanic inclusions in the J-9 sea-ice core,** *Antarctic journal of the United States,* 1985 20(5), p.113-115, 14 refs.

Oceanic inclusions in a 416 m core from the Ross Ice Shelf were observed in the bottom 6 m of the core. A preliminary analysis shows some extinct diatom species as well as species that exist today but are rare south of 60 S. A third group consists of what may be cysts of

a dinoflagellate. Ross Ice Shelf at J9 has travelled about 200 km from its grounding line over a period of 600 years, a rate of about 300 m/a.

F-35353

Chen, C.-T.A., **Salinity, alkalinity, and calcium of the Weddell Sea ice,** *Antarctic journal of the United States,* 1985 20(5), p.117-119, 16 refs.

Broken chunks of ice were collected from the Weddell Sea in the austral spring, 1981, and analyzed. Conductivity salinities and densities were measured by an Autosal and a Sodev densimeter; salinities were calculated from densities and a seawater equation of state. Alkalinity measurements at low salinity values are suspect because the methodology for the measurements has not yet been fully developed. Results of the analysis are tabulated.

F-35393

Hibler, W.D., III, **Ice dynamics,** MP 2211, NATO Advanced Study Institute on Air-Sea Interaction, Acquafredda di Maratea, Italy, Sep. 28-Oct. 10, 1981. Proceedings. Geophysics of sea ice. Edited by N. Untersteiner. NATO ASI series, Series B: Physics, Vol.146, New York, Plenum Press, 1986, p.577-640, Refs. p.637-640. For another source see 39-896 or 14F-30815.

Essential aspects of sea ice dynamics of the Arctic and Antarctic on the geophysical scale were reviewed and the role of ice dynamics in air-sea-ice interaction was discussed. The review is divided into the following components: a) a discussion of the momentum balance describing ice drift, b) an examination of the nature of sea ice rheology on the geophysical scale, c) an analysis of the relationship between ice strength and ice thickness characteristics, and d) a discussion of the role of ice dynamics in the atmosphere-ice-ocean system. Because of the unique, highly nonlinear nature of sea-ice interaction, special attention is given to the ramifications of ice interaction on sea ice motion and deformation. These ramifications are illustrated both by analytic solution and by numerical model results. In addition, the role of ice dynamics in the atmosphere-ice-ocean system is discussed in light of numerical modeling experiments, including a fully coupled ice-ocean model of the Arctic-Greenland-Norwegian seas.

F-35395

Lemke, P., **Stochastic description of atmosphere-sea ice-ocean interaction,** NATO Advanced Study Institute on Air-Sea Interaction, Acquafredda di Maratea, Italy, Sep. 28-Oct. 10, 1981. Proceedings. Geophysics of sea ice. Edited by N. Untersteiner. NATO ASI series, Series B: Physics, Vol.146, New York, Plenum Press, 1986, p.785-823, Refs. p.821-823.

A set of equations is calculated to define the discrete variables incorporated in probabilistic models which are intended to describe the interactions between ocean, sea ice, and atmosphere. The models, assisted by statistical methods, are applied to both arctic and antarctic sea ice variability and its various responses to atmospheric and oceanic dynamics.

F-35420

MacAyeal, D.R., **Rectified tidal currents and tidal-mixing fronts: controls on the Ross Ice Shelf flow and mass balance,** Princeton, Princeton University, 1983, 274p., University Microfilms order No.83-18726, Ph.D. thesis. Refs. p.264-274.

Numerical simulations of tides, ocean circulations and ice-shelf flow conducted in this study indicate the following results: vorticity transport caused by tidal pumping across depth contours drives anticyclonic circulation about shallow sub-ice-shelf topography and along the ice front. Heat transported by this circulation accounts for approximately 0.5 m/yr basal melting in the region within 150 km of the ice front. Tidally induced vertical mixing erodes stratification in the remote southeastern section of the sub-ice-shelf cavity where the ice shelf shoals. Efficient vertical heat transfer associated with this mixing catalyzes a large-scale thermohaline circulation. A dense, high-salinity water mass that dominates the lower depths of the open Ross Sea, and that has a temperature 0.3 C warmer than the *in situ* melting point at the ice-shelf base, flows into the sub-ice-shelf cavity along the sea bed. On reaching the vertically well-mixed zone, this water mass is lifted into contact with the ice and flows out of the sub-ice-shelf cavity along the sloping ice shelf base, entering the open Ross Sea at mid-depth. Finite-element ice-shelf flow simulations confirm previous contentions that basal melting increases ice-shelf resistance to deformation. (Auth. mod.)

F-35438

Comiso, J.C., Gordon, A.L., **Recurring polynyas over the Cosmonaut Sea and the Maud Rise,** *Journal of geophysical research,* Mar. 15, 1987 92(C3), p.2819-2833, 23 refs.

Two polynyas over the deep ocean were observed in the antarctic region during the winter of 1980: one near 43 E, 66 S, Cosmonaut polynya, and another near 2 E, 64 S, Maud Rise polynya. The time history of these two polynyas was examined on an alternate day basis using ice concentration maps from the Nimbus 7 scanning multichannel microwave radiometer (SMMR). A quantitative analysis of a study area around it shows that the totally enclosed Cosmonaut polynya attained a maximum size on July 25, 1980, with an open water area of as much as 137,700 sq km. This polynya lasted for a few weeks, disappeared on Aug. 16, 1980, and was not observed for the rest of the winter. Similar polynyas in the same region have occurred for several years, including 1973, 1975, 1979, 1982, and 1986. The Maud Rise polynya, on the other hand, was observed as a reduction in ice concentration to about 37% within the SMMR resolution of about 900 sq km. However, the open water area in the region amounted to 92,800 sq km on July 20, and the polynya recurred several times during the same winter period. It is proposed that both polynyas are products of deep-reaching convection which introduces warmer deep water into the surface layer. In this way, they are viewed as sensible heat polynyas in that they are maintained by oceanic heat. The oceanographic settings of these two polynyas are similar. The hydrographic data at both sites indicate the existence of localized doming of the pycnocline. This brings warmer, saltier deep water closer to the sea surface, an effective preconditioner for deep-reaching convection.

F-35469

Laird, C.M., **Nitrate deposition in Antarctica; temporal and spatial variations,** Lawrence, University of Kansas, 1986, 268p., Ph.D. thesis. Refs. p.218-227.

Through ultraviolet spectrophotometry, snow samples covering 15 years were analyzed from the surface and to 1.7-m depth at the South Pole and on the Ross Ice Shelf for nitrate concentration and deposition. Among the results: summer surface nitrate levels are nearly three times the annual mean; nitrate concentration spikes are real and probably reflect incomplete mixing of the summer and winter layers; unusually high nitrate levels were observed for 1984; a fairly strong temporal signal was found in the nitrate record, but horizontal variability is significant as well; calculations indicate that solar-charged particles are likely to modulate nitrate levels in the antarctic ice sequence at semi-periodic intervals as sharp one- or two-year peaks; and nitrate levels may vary slowly with time in response to changes in biological activity and climate. The findings indicate that antarctic nitrate profiles in the ice sequence are probably reliable, and therefore valuable, indicators of atmospheric chemistry, paleoclimate and solar activity on both short (1 yr or less) and long (100,000-1,000,000 yr) time scales. The results also underscore the need for replicate ice cores in the future for both long-term and high-resolution studies. (Auth. mod.)

F-35480
Suetova, I.A., **Area of Antarctica and its ice shelves (on the basis of new cartographic data),** *Polar geography and geology,* Jul.-Sep. 1986 10(3), p.213-226, For Russian original see 40-3642 or F-33888. 9 refs.

The article compares the area of the antarctic ice shelves as presented on earlier maps (1961 and 1964) with that based on the latest available data (1984). The results indicate that despite catastrophic calvings such as those from the Amery, West, Bellingshausen, and Thwaites ice shelves, involving a total of about 20,000 sq km of ice, the total area of the antarctic ice shelves during this 20-year period increased by 135,000 sq km or by 9%. This expansion is largely the product of improvements in plotting the boundaries of the ice shelves, especially their inner boundaries. The latest estimate of the total area of the continent, including ice shelves and islands attached by ice shelves, is 13,980 million sq km. (Auth.)

F-35481
IAkovlev, V.N., Kovalev, A.D., **New data on the position of the Bellingshausen Ice Shelf,** *Polar geography and geology,* Jul.-Sep. 1986 10(3), p.227-231, Translation of Vsesoiuznoe geograficheskoe obshchestvo. Izvestiia,.118(3):255-258, 1986. 3 refs.

The Bellingshausen Ice Shelf was a prominent lobe-shaped tongue which projected from the coast of Antarctica on the Greenwich Meridian. First charted in 1938-39, it was still about the same size in 1949-52, reaching about 69 deg 25'S. But by 1955 it had expanded enormously, reaching a latitude of approximately 69 S; its area north of the 70th parallel was about 5000 sq km. A survey made from the Soviet research vessel *Evrika* in March 1981 revealed that the ice shelf had shrunk drastically, its boundary was observed to be approximately still in the same position during a visit by the Soviet vessel *Vol'nyy veter* in January 1983. (Auth.)

F-35487
Lindstrom, D.R., MacAyeal, D.R., **Paleoclimatic constraints on the maintenance of possible ice-shelf cover in the Norwegian and Greenland seas,** *Paleoceanography,* Sep. 1986 1(3), p.313-337, 43 refs.

The controversial issue of whether or not an integrated ice shelf existed in the Norwegian and Greenland seas during glacial events of the Pleistocene is examined. The method consists of testing for equilibrium ice shelf configurations with the use of a finite element model that predicts ice shelf evolution under a variety of atmospheric and oceanic forcing conditions. Ice flow at the margins of the simulated hypothetical ice shelf is determined from a reconstruction of continental glaciation applicable to the last glacial maximum. Results suggest that the existence of the ice shelf, and possibly surrounding marine-based ice sheets, depends most sensitively on oceanic heat flux. A heat flux of approximately 4.80 J/sq m/s is near the upper limit allowing ice shelf equilibrium. Greater heat flux causes an initial 450-m-thick ice shelf to collapse rapidly. The equilibrium ice shelf configurations examined provide effective buttressing support for the marine ice sheet grounded in the Barents Sea 18 kyr B.P. At various places throughout the essay, the model is compared to similarities occurring in antarctic ice sheets. An appendix contains an exposition of the full range of these similarities. (Auth. mod.)

F-35499
Van der Veen, C.J., ed, Oerlemans, J., ed, **Dynamics of the West Antarctic Ice Sheet,** Dordrecht, D. Reidel, 1987, 368p., Refs. passim. For individual papers see 41-3272 through 41-3287, or F-35500, F-35502 through F-35515 and J-35501.

The book contains the proceedings of a workshop on the dynamics of the West Antarctic Ice Sheet, held in Utrecht May 6-8, 1985, providing an up-to-date overview of current research and problems encountered in assessing the reaction of West Antarctica to climatic warming. Topics include: the oceanic circulation near ice shelves, mathematical models of ice-shelf flow, the ice shelf-inland ice interaction, and the flow of subglacial water. In addition, a number of papers are included which present results and interpretations of recent observations.

F-35500
Van der Veen, C.J., **West Antarctic Ice Sheet: the need to understand its dynamics,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.1-16, Refs. p.14-16.

As a general introduction to the environment of West Antarctica, some of the problems are highlighted which relate to possible responses of the West Antarctic Ice Sheet to climatic warming. Included are: a short description of Antarctica, with a map showing its main geographic features; illustrations of the current antarctic surface elevation contours, the bedrock topography and the bedrock after isostatic rebound; discussion of the fringing ice shelves hypothesis, with sketches of a marine ice sheet showing the processes that control the flow of ice from the inland parts to the sea and the disintegration of West Antarctica caused by ice-shelf thinning; and a review of the antarctic climate and of the literature dealing with the antarctic oceanic subshelf circulation.

F-35502
Lange, M.A., **Quantitative estimates of the mass flux and ice movement along the ice edges in the eastern and southern Weddell Sea,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.57-74, 14 refs.

Data on the positions of ice edges in the eastern and southern Weddell Sea for the years 1980 to 1984 are presented. The apparent areal growth of individual ice shelves in the Weddell Sea region are also assessed. Together with estimates of near-ice-edge ice thicknesses, an apparent annual discharge rate is computed. Results for the Filchner-Ronne and the Brunt ice shelves amount to apparent calving rates which, in the case of the Filchner-Ronne Ice Shelf, is lower than previous estimates. Most of the major ice shelves in the Weddell Sea region show steadily advancing ice fronts during the period of observation. This has the consequence that the source region for icebergs during this time should be limited mainly to ice fronts in the eastern Weddell Sea. The present results support earlier contentions that large ice shelves undergo episodic, major calving events with frequencies well in excess of a few years, while smaller ice shelves are subject to more frequent calving, thus keeping the ice fronts close to equilibrium. (Auth. mod.)

F-35503
Doake, C.S.M., **Some aspects of the flow of the Ronne Ice Shelf,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.75-98, 23 refs.

A new ice-thickness map has been compiled for the Ronne Ice Shelf north of 81 S. Comprehensive cover was obtained during the 1982/83 season with flight lines at approximately 50 km spacing. The major features described previously are confirmed, but additional information over the western half of the ice shelf, where there were few data before, has revealed the strong identity of individual ice streams. Individual features on radio-echo records, such as abrupt changes in echo strength or prominent bottom crevasses, allow flowlines to be drawn over the western part of the ice shelf. These correspond well with surface features seen on Landsat images. (Auth. mod.)

F-35504
Morland, L.W., **Unconfined ice-shelf flow,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.99-116, 4 refs.

The spreading of an unconfined ice shelf in two horizontal directions involves the variation of the two horizontal velocity components and the thickness in both directions. Exploiting the slow variation of physical quantities in both horizontal directions compared to vertical variation allows simple solution of the vertical momentum balance and the derivation of plane stress equilibrium equations for integrals of the horizontal stresses through the thickness, together with integrated traction conditions on a front contour defining the boundary of smooth flow. This is the basis of a companion paper (see 41-3277 or F-35505) which treats both plane and axi-symmetric flow. (Auth. mod.)

F-35505
Morland, L.W., Zainuddin, R., **Plane and radial ice-shelf flow with prescribed temperature profile,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.117-140, 12 refs.

The longitudinal velocity and thickness of an ice shelf in steady plane flow, when temperature is prescribed as a function of the spatial coordinates, are determined by simultaneous integro-differential equations. These are solved numerically to illustrate the effects of temperature distribution, depth and ice flux at the grounding line, and surface accumulation. The corresponding integro-differential equations for axi-symmetric flow are derived, which involves a strain rate transverse to the radial direction and hence non-planar spreading. Numerical solutions for a grounding line at a mean antarctic radius and a range of ice-flux values are presented. Comparisons with corresponding plane-flow solutions indicate that radial spreading has little influence. (Auth. mod.)

F-35506
MacAyeal, D.R., **Ice-shelf backpressure: form drag versus dynamic drag,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.141-160, Refs. p.158-160.

The inadequacy resulting from the action of glaciostatic stresses distributed around the margins of an ice shelf leads to a reaction force, termed *form drag,* at the grounding line of an ice stream. The stress regime at the sounding line of the West Antarctic Ice Sheet is examined in terms of *form drag* and *dynamic drag,* the latter of which arises purely due to ice-shelf motion and viscous coupling at the ice-shelf shear margins. Finite-element simulations of the Ross Ice Shelf discussed here show that *form drag* dominates *dynamic drag* at the grounding line of ice streams B and C. As a demonstration of the consequence of this dominance, the future evolution of the Ross Ice Shelf, and of the stress regime at the grounding line of ice streams B and C are simulated to assess the response to impulsive removal of the Crary Ice Rise. This simulation shows that the forces restraining Ice Stream B do not change by a significant amount even after 1000 years of simulated adjustment. The forces restraining Ice Stream C, however, reduce by 40% over the 1000 year period, with an initial 25% change occurring within the first 250 years. This contrast between ice streams B and C is attributed to the dominance of *form drag,* its dependence on the ice-shelf thickness distribution, and the effect Crary Ice Rise has on the ice-shelf thickness at the grounding lines of the two ice streams. (Auth. mod.)

F-35507
Bindschadler, R.A., MacAyeal, D.R., Stephenson, S.N., **Ice stream-ice shelf interaction in West Antarctica,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.161-180, 20 refs.

Results are presented from two years of field data collected along the Siple Coast region of West Antarctica. Measurements were made in the vicinities of base camps which were established in the mouths of ice streams B and C and at the upstream edge of Crary Ice Rise. The annual rate of ice deformation in Ice Stream C is very small. The surface topography of Ice Stream B exhibits elongated ridges instead of the smoother surface of Ice Stream C. Regions of Ice Stream B with a lower surface elevation move faster than higher elevation regions, presumably because the lower-elevation ice is thinner and experiences less basal friction. Surface strain rates at Ice Stream B vary on a scale similar to the topographic relief but transverse differences in downstream velocity are only 1 to 2% of the 527 m/yr ice motion. This value is slightly higher than predictions of the balance velocity which range between 450 and 480 m/yr. Near Crary Ice Rise, surface strain rates show increasing compression of the ice as it approaches the ice rise. The upstream boundary of Crary Ice Rise has been accurately determined based on a combination of surface measurements, aerial photography and radar-sounding data. (Auth. mod.)

F-35508
Bentley, C.R., **A few preliminary results from the glaciogeophysical survey of the interior Ross Embayment (GSIRE),** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.181-184, 2 refs.

Extensive airborne radar measurements were made during the 1984-85 field season covering ice streams A, B and C, Crary Ice Rise, and the grid northwestern corner of the Ross Ice Shelf. A sample profile across Ice Stream A shows a pronounced subglacial trough. Surface features showing in the radargram suggest the boundaries between the outflow, within Ice Stream A, from Reedy Glacier, Horlick/Shimizu Ice Stream, and the glaciers in between. These boundary zones can be traced downstream across the Ross Ice Shelf to a point about grid north of Crary Ice Rise. The ridge between ice streams A and B is relatively free of surface "clutter" produced by crevassing. The grid northern boundary of Ice Stream branch B1 (the grid northerly branch), marked by pronounced surface crevassing, overlies nearly the bottom of a downslope into a subglacial trough. Profiles over Crary Ice Rise show the striking contrast between clutter-free ice on the ice rise and strong clutter over the surrounding ice shelf. Short-pulse radar surveys have been carried out on the surface at camps UPB and UPC, the latter being on Ice Stream C. Abundant near-surface crevasses are seen around both camps, at an average depth of about 15 m at UPB and about 35 m at UPC.

F-35509
Herterich, K., **On the flow within the transition zone between ice sheet and ice shelf,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.185-202, 7 refs.

The horizontal and vertical velocity components within the transition zone between ice sheet and ice shelf are computed on a plane perpendicular to the grounding line. The transition flow is found numerically by solving a non-linear elliptic differential equation with fixed boundary conditions. The transition zone is located around the grounding line and its width is of the order of the ice thickness. In the case of basal sliding the transition zone can be widened considerably. The Riiser-Larsenisen Ice Shelf is considered to be a promising candidate where two-dimensional calculation might be applied. (Auth. mod.)

F-35510
Fastook, J.L., **Finite-element method applied to a time-dependent flowband model,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.203-221, 12 refs.

The finite-element technique as applied to a 1-D flowband model of an ice sheet is described, as well as several modeling experiments to demonstrate the power of this technique. Based on the time-dependent continuity equation with ice velocity specified by a combination of flow and sliding laws, this fully time-dependent flowline-oriented finite-element model is used to: compare computed steady-state and measured velocities in the Byrd Glacier, as well as to derive driving stress patterns, and estimates of the degree of sliding and creep deformation; show the time evolution of an idealized flowband in which the ice hardness parameter undergoes a sudden 50% reduction; show the time evolution of an idealized flowband in which the accumulation is doubled; investigate the formation of an ice stream in a region originally dominated by sheet flow, and to display the time evolution of the surface elevation and the driving traction on various time scales as the ice stream forms, as well as to show the changing mass outflow at the grounding line. (Auth.)

F-35511
Van der Veen, C.J., **Longitudinal stresses and basal sliding: a comparative study,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.223-248, 23 refs.

The main problems in understanding the dynamics of a marine-based ice sheet are (i) the role played by longitudinal deviatoric stresses, and (ii) basal sliding. Although several studies have been reported in which both processes are incorporated in an ice-sheet model (either a numerical or a theoretical model), it is not clear how they affect the model outcome. An equation for the deviatoric stress is derived from the flow law and the equilibrium of forces. Incorporating this in a numerical model, together with an appropriate sliding relation, allows one to study the effect of (i) and (ii) on the behavior of the model ice sheet. As for basal sliding, two laws were applied. The classical Weertman-type sliding relation, corrected for subglacial water pressure, has little effect on the shape of the model ice sheet; a similar decrease in ice-sheet size can be obtained by increasing the deformation constant in the flow law. On the other hand, the sliding relation as used by Budd et al. (1984) causes a large thinning near the grounding line which is greatly enhanced when longitudinal stresses are incorporated in the model. Together, these processes yield a concave surface profile as observed on west antarctic ice streams. (Auth. mod.)

F-35512
Lingle, C.S., Brown, T.J., **Subglacial aquifer bed model and water pressure dependent basal sliding relationship for a West Antarctic Ice Stream,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.249-285, Refs. p.281-285.

A subglacial aquifer bed model and basal sliding relationship is constructed for Ice Stream B, West Antarctica. The calculated subglacial water discharge is 3 to 18 cu m/s at the grounding line. The inferred subglacial water pressure is greater than 90% of the ice overburden pressure for the entire 300 km length of the ice stream, and greater than 96% of the ice overburden pressure for 230 km upglacier from the grounding line. This suggests that the high pore-water pressure mechanism proposed as an explanation of overthrust faulting also facilitates the rapid motion of the ice stream through the slower-moving mass of the ice sheet. Results suggest that if surge velocity is defined as abnormally high velocity for an ice mass of given geometry, due to minimal coupling at the bed caused, in turn, by high subglacial water pressure, then Ice Stream B is moving at surge velocity. This implies that ice streams may be expressions of ice-sheet surges. If so, the question of whether the West Antarctic Ice Sheet can surge (in a conventional sense), in response to warming climate caused by increasing CO2 and other "greenhouse" gases, should be replaced by the question of whether the ice streams can accelerate, such that the rate of discharge across grounding lines exceeds the rate of replenishment over catchment areas. This question is of similar significance, because if ice-stream acceleration causes the mass balance of the West Antarctic Ice Sheet to become negative, thinning will occur, grounding lines will retreat, and sea level will be affected. (Auth. mod.)

F-35513
Oerlemans, J., **Heat budget of the Ross drainage basin,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.287-292, 11 refs.

Integration of the thermodynamic equation over an entire drainage basin yields a fairly simple expression for the steady-state heat balance. This stems from the fact that dissipative heating can be calculated directly from the release of gravitational energy. When mass balance, surface temperature and geothermal input are known, the mean ice temperature at the grounding line can be obtained as a residual. The procedure is applied to the drainage basin feeding the Ross Ice Shelf. The resulting mean outlet temperature is -16.2 C. The heating rates making the balance turn out to be (in 0.0001 K/yr): dissipation 8.2, advective flux divergence -13.5 and geothermal heating 5.3. The method also reveals how the mean outlet temperature depends on mass balance, surface elevation, etc. (Auth.)

F-35514
Budd, W.F., Jenssen, D., **Numerical modelling of the large-scale basal water flux under the West Antarctic Ice Sheet,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.293-320, Refs. p.318-320.

The three-dimensional ice-sheet model of the Ross Ice Shelf Basin has been used to compute basal temperatures and melt rates for a wide range of values of the geothermal flux. Steady state is assumed and ice "balance velocities" are computed from continuity and used in the heat-conduction equation. As the geothermal flux increases, the melt area increases and becomes connected to the water under the Ross Ice Shelf via the major ice streams. The large-scale average surface and bed slopes are used to determine the broadscale pattern of flow of the basal meltwater on the assumption that it flows as a film at the ice-bedrock interface. The total water volume flux for steady state is determined from the basal melt rates and continuity, and the film assumption then allows the mean water film thickness and velocities to be computed. The resulting pattern of steady-state mean water-film thickness is then interpreted in terms of its possible relationships to the basal sliding rates and the basal shear stress particularly under the major ice streams. (Auth.)

F-35515
Budd, W.F., McInnes, B.J., Jenssen, D., Smith, I.N., **Modelling the response of the West Antarctic Ice Sheet to a climatic warming,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.321-358, Refs. p.351-358.

The present generation of coupled atmosphere-ocean general circulation models have provided useful information on the possible decrease in the antarctic sea-ice cover and the increase in ocean temperatures over time as a result of the warming following the increased atmospheric carbon dioxide concentration. This information has been used to analyze the extreme likely increases in the melt rates

of the antarctic ice shelves and the resulting increased strain rates which could then occur near the grounding lines. A hierarchy of ice-sheet modelling studies has been carried out covering the fast-flowing ice streams, the ice sheet thermal regime and the whole Antarctic at a coarser resolution. The range of consequences likely for ice loss and sea-level rise are computed in detail for the next 500 years, and in less detail for several thousand years hence. It is concluded that the effects for sea-level change could be substantial but of a magnitude (up to 1 m in 500 years and 3.5 m in 1000 years) and a rate of change (maximum of 0.6 m/100 years) that could be manageable if adequate monitoring and planning are carried out. (Auth. mod.)

F-35629

Doake, C.S.M., **Antarctic ice and rocks,** Antarctic science, D.W.H. Walton, ed., Cambridge, Cambridge University Press, 1987, p.138-189, 18 refs. (p.273).

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Ice in its various forms is examined and its effects on global climate are reviewed. The dominant role of ice in all aspects of antarctic life is emphasized. Statistically, the antarctic ice sheet is awesome: it covers an area of about 14 million sq km, 1.5 times the size of the US, has an average thickness of 2.3 km, maximum 5 km, and contains 90% of the world's fresh water. Drilling and analysis of ice cores are discussed to show how core data reflect global climate and pollution histories. The tectonic history of Antarctica is traced to Gondwana and an assessment is made of the availability of non-living natural resources in the region. Regarding icebergs as a natural resource and towing them to arid regions as a fresh water source, the comment is made that "It is most unlikely that an iceberg, however well protected from the warm ocean..., would manage to cross the equator crackling away in anything other than a glass of gin."

F-35652

Dowdeswell, J.A., McIntyre, N.F., **Surface topography of large ice masses from Landsat imagery,** *Journal of glaciology,* 1987 33(113), p.16-23, 24 refs.

Apparent ice-surface topography is observed at several scales on Landsat multi-spectral scanner (MSS) imagery. Digitally enhanced MSS scenes from Antarctica and Nordaustlandet, Svalbard, are compared with ice-surface elevations from aircraft altimetry to show that this apparent topography is real. On Byrd Glacier, Antarctica, apparent "flow lines" coincide with ridges on altimetric records. Synoptic Landsat data, calibrated by information from aircraft altimetric flight lines, are used to classify the surface roughness of the ice caps on Nordaustlandet and 40% of the antarctic ice sheet. On Nordaustlandet, and roughest ice is of amplitude 15-25 m and wavelength 3-4.5 km. Drainage basins with such rough surface characteristics may be associated with ice streams or possibly past surge activity. The roughest antarctic terrain is up to 60 m in amplitude, with wavelengths of <10 km. The roughness of the antarctic ice sheet increases with distance from ice divides, reflecting changes in the parameters affecting the transfer of basal stresses to the ice surface. (Auth.)

F-35682

Buckley, R.G., Trodahl, H.J., **Scattering and absorption of visible light by sea ice,** *Nature,* Apr. 30, 1987 326(6116), p.867-869, 15 refs.

In situ measurements are reported of the diffusive transport of light in the sea ice of McMurdo Sound. This novel experimental method permits the resolution of the depth dependence of the scattering and allows identification of an isotropic top layer, an anisotropic bulk layer and a strongly absorbing algal layer. The anisotropic scattering exerts a strong influence on the radiation field in and under the ice.

F-35683

Engelhardt, H., Determann, J., **Borehole evidence for a thick layer of basal ice in the central Ronne Ice Shelf,** *Nature,* May 28, 1987 327(6120), p.318-319, 11 refs.

Extensive radio-echo sounding (RES) by Robin and others revealed reflections in the central part of the Ronne Ice Shelf at the relatively shallow depth of 100-200 m below surface. The interpretation of these echoes, which varied in strength, was ambiguous, and the possibility of internal reflecting horizons was thoroughly discussed. But after surface elevation measurements by radar altimeter from drifting balloons appeared to fit the presence of thin ice, it was decided to base a thickness map of the Ronne Ice Shelf on these RES echoes. Direct observational evidence from boreholes shows that the total ice thickness is much greater than mapped, and that the shallow RES reflections therefore do come from internal horizons. (Auth.)

F-35690

Gonda, T., Sei, T., Wada, M., **Growth form of ice crystals grown in air at low supersaturation and their growth mechanism,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.30-37, 16 refs.

The morphological instability and the growth mechanism of ice crystals grown in air at -30 C and at supersaturation below 4% have been experimentally studied. Whether ice cystals grown under this condition would develop into long prismatic columns or into thin plates is dependent on the emergence of active screw dislocations on the *0001* or *1010* faces of the crystals. The morphological instability of ice crystals grown in air at low supersaturation is related to the emergence of active screw dislocations near the corners of the *0001* or *1010* faces. From the experimental results, the growth form and the growth mechanism of snow crystals at low supersaturation observed at Mizuho Station are discussed. (Auth.)

F-35691

Iwai, K., **Morphological features of combination of bullet-type snow crystals observed at Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.38-46, 13 refs.

Morphological features of combination of bullet-type snow crystals replicated at Showa Station are discussed. Some stereophotomicrographs are shown. The number of bullets forming the combination was counted. The bullets with five components were the most frequently observed. The maximum number of components was ten. The angles of their *c*-axes were measured, and supplementary angles of about 70, 55 and 88 deg were found to be predominant. In addition, 64 and 78 deg angles were found. Apparent pyramidal faces of bullet crystals are not the crystallographic pyramidal faces, *1011,* but are mere skeleton structures. These findings will be important for discussing optical phenomena in the antarctic atmosphere. (Auth.)

F-35692

Nishikawa, M., Ambe, Y., Chubachi, S., **Concentrations of trace elements in surface snow in the area near Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.47-55, 18 refs.

Surface snow samples were collected in the area near Showa Station, with contamination-free technique. Snow samples were melted and filtered with a membrane filter. The filtrates were analyzed by inductively coupled plasma emission spectrometry and by

ion chromatography after evaporation preconcentration by a rotary evaporator. Particulate matter trapped on the filter was also analyzed. From comparison of the results with average chemical composition of seawater and earth crust, the origin of elements in the snow was estimated. (Auth. mod.)

F-35693

Okamoto, K., **Step frequency radar for the measurement of sea ice thickness,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.56-65, 11 refs.

Preliminary experiments have been carried out to test the fundamental functions of the step frequency radar. This radar aims at measuring the thickness of the antarctic sea ice, transmitting 32 different frequencies in a stepwise fashion between 300 and 796 MHz. The radar system includes the following: maximum transmitting power of 400 mW; range resolution about 0.3 m in the air; maximum observable distance without an ambiguity of about 9.1 m in the air; and transmitting and receiving antennas. The experiments in the anechoic chamber prove that this radar system can successfully detect an iron pipe buried in dry sand and an aluminum plate placed under a sand box. It is suggested that an airborne survey of the sea ice thickness will become possible by using the system described. (Auth.)

F-35694

Kawada, K., Yoshida, M., Naruse, R., **Borehole closure at Mizuho Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.66-73, 8 refs.

The 400-m deep hole drilled in 1983 at Mizuho Station was used for measurements of the contraction of diameter in 1984. Depth-profiles of the diameter were obtained several times by using a three-contact-points caliper. Relationship between the stress and the strain rate of ice in the borehole was evaluated under the assumption that the strain rate was constant in the early stage of strain below approximately 0.08. Closure rates of the hole at Mizuho Station showed almost the same or slightly higher values than those in the same stress range derived by other investigators. (Auth. mod.)

F-35695

Narita, H., Nakawo, M., Fujii, Y., **Textures and fabrics of 700-m deep ice core obtained at Mizuho Station, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.74-77, 4 refs.

Crystal grain-areas and shape factors of a 700-m deep ice core obtained at Mizuho Station in 1983-1984 were measured from photographs of thin sections taken in cross-polarized light within a month after the core recovery. Also, *c*-axis orientations were examined with sections at selected depths *in situ*. Comparison of the data with those of the Camp Century, Dye III and Byrd Station cores indicated that ice of late Wisconsin might be existing at depth below about 520 m at Mizuho Station. (Auth.)

F-35696

Nakawo, M., **Volume expansion of a 413.5-m Mizuho core after its recovery,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.78-85, 17 refs.

The density of core samples was measured soon after thcir recovery, and the measurement was repeated 1, 3, 6 and 27 months later. It was found that the density decreased significantly with time. The decreasing rate increased with depth, and decreased with time. The data have been analyzed on the basis of a stress-strain relationship. (Auth. mod.)

F-35697

Suzuki, Y., Shimbori, K., **Development of an ice core drill for liquid-filled holes,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.86-92, 4 refs.

Simple tests simulating drilling in a liquid-filled hole were done of an S-type Archimedean core drill, consisting of a drive-unit, a jacket, a shaft with a screw booster and a sweeper, and a barrel. The barrel length was 0.9 m. The tests revealed that the clearance between the jacket and the barrel (which together made up an Archimedean pump) should be a little wider for drilling in a liquid-filled hole than in a dry hole. With a clearance of 7.4 mm, the pump could transport ice chips to the storage space between the booster and the sweeper, where the booster compacted chips by squeezing a large portion of the liquid through the sweeper which was permeable to liquid. The porosity of compacted chips could be as low as 35%. (Auth.)

F-35704

Ageta, Y., Kikuchi, T., Kamiyama, K., Okuhira, F., **Glaciological research program in east Queen Maud Land, East Antarctica, Part 5, 1985,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1987 No.125, 71p., 5 refs.

JARE-26, 1984-1986, extended the field work of the East Queen Maud Land Glaciological Project. Major activities involved overs-now traverses toward the inland plateau and Sör Rondane Mountains, and ice core drillings to depths of 200 m, 40 m and 100 m. Temperature distributions and variations of diameters of the drill-hole were measured at Mizuho Station using the 700 m hole bored by JARE-24 and -25. Among the data obtained during the traverses, the following are compiled in this report: position, elevation and ice thickness of stations; net accumulation of snow measured by the stake method; and surface meteorological data. The report includes data on the net accumulation of snow and the temperature profiles in a surface snow layer at Mizuho Station.

F-35713

McIntyre, N.F., Cudlip, W., **Observation of a giant antarctic tabular iceberg by satellite radar altimetry,** *Polar record,* Jan. 1987 23(145), p.458-462, 15 refs.

The iceberg reported here was detected in radar altimeter data collected by NASA's Seasat satellite, which operated between July and Oct. 1978. By timing the delay between transmission of a radar pulse and receipt of its echo, the instrument measured surface heights along the satellite ground track. For one second averages over the open ocean, the instrument achieved a precision of up to 10 cm; over sea ice, ice sheets and ice shelves precision was much reduced. Using the technique of Thomas and others (1984) to pinpoint crossings of its margins, the iceberg's length along the satellite ground track has been determined to be 111.3 km and moving with a velocity of approximately 2 km per day. Linear extrapolation of the elevations of adjacent sea ice, which is likely to be first year ice with a freeboard of less than 1 m, gives the iceberg's freeboard as 47.1 m and 43.7 m at its northeast and southwest ends, respectively. Minimum and maximum values are 34.7 m and 49.7 m. Using the empirical relation between freeboard and thickness of the Brunt Ice Shelf which has been reported to produce icebergs of comparable height, estimated thickness varying between 232 m and 357 m was obtained.

F-35715
Seidov, D.G., Dorogokupets, S.A., **Possible role of standing waves in the dynamics of the ice sheet of the Weddell Sea,** *Soviet meteorology and hydrology,* 1986 No.2, p.90-93, Translated from Meteorologiia i gidrologiia. 6 refs.

An attempt is made to explain the formation and maintenance of regions of open water (neve air holes in ice) in the Antarctic. It is shown that upon the formation of standing waves in the sea level, solid sea ice cannot exist near the shore. It is assumed that the neve breaks up under the influence of anomeobaric long waves in resonance with the semidiurnal tide. If the neve breaks up, the standing waves prevent the closure of the fractures near the shore, which may develop into large air gaps. (Auth.)

F-35748
Lucchitta, B.K., Ferguson, H.M., Summers, C., **Sedimentary deposits in the northern lowland plains, Mars,** *Journal of geophysical research,* Nov. 30, 1986 91(B13), p.E166-E174, Refs. p.E174.

Sinuous ridges at the mouths of Martian outflow channels resemble ridges in antarctic ice streams and ice shelves; the similarity suggests that the Martian material was transported from the southern highlands toward the northern plains, as the antarctic material is transported from the continent toward the adjacent ocean. Overall, it appears that a massive transfer of material took place midway in Martian history, either through the outflow channels or elsewhere along the northern highland scarp, and that this material probably formed the deposits now characterized by polygonal fracture patterns. (Auth. mod.)

F-35754
Shabtaie, S., Bentley, C.R., **West antarctic ice streams draining into the Ross Ice Shelf: configuration and mass balance,** *Journal of geophysical research,* Feb. 10, 1987 92(B2), p.1311-1336, Refs. p.1335-1336.

Mass of the boundaries of the ice streams and their flow bands on the Ross Ice Shelf are presented and discussed. The surfaces of the active ice streams, A and B, are heavily crevassed, but there are no visible crevasses on ice stream C. The existence of numerous crevasses at a depth of about 35 m implies that ice stream C ceased to be active about 250 years ago. There is a complex zone at the head of ice stream B that suggests that ice stream B is currently widening and advancing toward the interior of the ice sheet. To relate surface elevation data from satellite observations to sea level, three geoidal models were tested. It is concluded that the GEM 10C model is the best of the three for this section of Antarctica. The overall net balance of this part of the West Antarctic inland ice is suggestively negative (-23 cu km/yr). From the measured flux into the Ross Ice Shelf and previous measurements, an average basal melt rate from beneath the ice shelf of 0.12 m/yr is calculated. (Auth. mod.)

F-35773
Squire, V.A., **Moving loads on sea ice,** *Polar record,* May 1987 23(146), p.569-575, 4 refs.

A load moving on sea ice, whether the weight of a vehicle or the pressure exerted by a low-flying aircraft, produces a deflection which can in extreme cases cause ice failure. The magnitude and shape of the deflection profile depends on the weight and speed of the vehicle, and also the ice thickness and properties, with flexural-gravity waves radiating from the source at speeds above a critical value. This wave pattern was studied in detail on flat, snow-free sea ice in McMurdo Sound. Surface strain was measured directly and microcracking activity monitored to correlate measured strain with possible generation of dangerous cracks. Speeds of up to 28 m/sec (60 mph) were achieved with a pickup truck, and up to 80 m/sec with a US Navy C131 aircraft. Initial comparison between theory and experimental results is very encouraging. (Auth.)

F-35774
Ferrigno, J.G., Gould, W.G., **Substantial changes in the coastline of Antarctica revealed by satellite imagery,** *Polar record,* May 1987 23(146), p.577-583, 13 refs.

NOAA AVHRR and Landsat MSS imagery acquired between Jan. and Nov. 1986 has shown substantial changes in the antarctic coastline near the Filchner Ice Shelf, Larsen Ice Shelf and Thwaites Glacier. In the Filchner Ice Shelf area some 11,500 sq km of ice calved from mid-Apr. onward. In the Larsen Ice Shelf area two large bergs calved between Feb. and Aug. The combined volume of ice from these two events equals approximately three years' normal calving from the entire antarctic coastline. In the Thwaites Glacier area several changes appear to have occurred at the base of Thwaites Iceberg Tongue and Thwaites Glacier Tongue. (Auth.)

F-35802
Palais, J.M., **Polar ice cores,** *Oceanus,* Winter 1986 29(4), p.55-60, 3 refs.

The 3 distinct chemical forms in which information on atmospheric composition and climate is preserved in ice cores are discussed. They are the stable isotope composition of the ice itself, the soluble and insoluble impurities and heavy metals, and the bubbles in the ice. The value of the ice core record, with regard to the depth-age relationship, temperature and precipitation, atmospheric gases, aerosols, and dynamics of the ice sheet is considered in detail.

F-35828
Aver'ianov, V.G., **Problems in glacier-climatic studies in Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.86-91, For Russian original see 35-2182 or 12F-24446. 11 refs.

The state of the art of glacioclimatology with regard to antarctic ice cover is reviewed and the most pressing questions for further research are outlined.

F-35848
Gow, A.J., Sheehy, W., **Annealing recrystallization in laboratory and naturally deformed ice,** *Journal de physique,* MP 2230, Mar. 1987 48(3) Supplement, p.(C1)271-(C1)276, With French summary. 9 refs.

Results are presented of annealing recrystallization in both naturally and laboratory deformed ice. Thin section techniques were used to follow the progress of recrystallization which, in the case of highly compressed ice pellets annealed at -3 C, showed that as soon as any new crystal was nucleated in the deformed ice matrix it retained its lattice orientation over the duration of the recrystallization. Laboratory annealing at ambient pressures of highly deformed, strongly oriented crystal ice from cores deep in the Antarctic Ice Sheet resulted in growth of very large crystals exhibiting c-axis orientations very much degraded with respect to the original ice. Textures and fabrics of the same ice annealed at 200 bars confining pressure closely resembled those observed in ice undergoing dynamic (annealing) recrystallization at 190-200 bars overburden pressure near the base of the ice sheet, which at this location in Antarctica was at pressure melting. (Auth.)

F-35849

Hodge, S.M., **Ice sheet topography and internal characteristics from microwave and radar measurements,** International Symposium on Remote Sensing of Environment, 19th, Ann Arbor, MI, Oct. 21-25, 1985. Proceedings, Vol.1, Ann Arbor, Environmental Research Institute of Michigan, [1986], p.237-255, Refs. p.249-251.

Satellite radar altimetry and very-high-frequency (VHF) radar sounding are important remote sensing techniques for the study of the Antarctic and Greenland ice sheets. This paper describes the major scientific results which have been found by using them, as well as their scientific limitations and relevance to ice sheet dynamics. Radar sounding, in particular, is indispensible to polar glaciology, not only because it provides the most crucial data of all, the ice thickness, but also because it has yielded a wealth of unexpected information, such as flow tracers, presence or absence of liquid water at the bed, and evidence of past volcanism. (Auth.)

F-35869

Nagurnyĭ, A.P., **Modelling of continental and sea ice as part of climate models** [Modelirovanie kontinental'nogo i morskogo l'da v modeliakh klimata], *Vsesoiuznyĭ institut nauchnoĭ i tekhnicheskoĭ informatsii. Itogi nauki i tekhniki. Seriia meteorologiia i klimatologiia,* 1986 Vol.13, 104p., In Russian with English table of contents enclosed. 192 refs.

The three parts of this book cover the general characteristics of the cryosphere, the parametrization of snow-ice cover in climate models, and the modelling of climate in polar regions. Antarctic topography, antarctic ice cover thickness and its effect on heat transfer between the atmosphere and ocean, and the role of the snow and ice cover on global climatic changes are discussed and charts are included. Tabulated results are presented of the reaction of the Arctic and Antarctica in experiments with CO2 on general atmospheric circulation models.

F-35870

Orheim, O., Drewry, D., **Flow and thickness of Riiser-Larsenisen, Antarctica,** *Oslo. Norsk Polarinstitutt. Skrifter,* 1986 No.187, p.5-22, Refs. p.20 and 22. With Appendix: SPRI radio echo soundings of Riiser-Larsenisen, by D. Drewry.

The Norwegian Antarctic Research Expedition (NARE) 1978/79 used the SPRI Mk IV System fitted in a helicopter to fly 620 km radio echo sounding over the central part of Riiser-Larsenisen, and 100 km across the outer part of Stancomb-Wills Ice Stream. Observed thicknesses of Riiser-Larsenisen decrease from a maximum of 650 m a few km from the grounding line to less than 200 m at the ice front. The Kvitkuven ice rise shows thicknesses between 200 m and 500 m. The thickness data suggest that the ice shelf east of Kvitkuven turns clockwise and flows obliquely to the ice front. The radio echo sounding indicates that the ice shelf has a complex flow regime. Steplike change in thickness of >150 m over a 500 m horizontal distance is observed in the central part of the ice shelf. The records also demonstrate undulations in ice thickness and bottom morphology of 600-700 m wavelength and 50 m amplitude, and various types of rifts and crevasses. Internal layering is recorded at 250-300 m depth within the Kvitkuven ice rise and in the ice shelf upstream of the ice rise. Combination of the NARE data with radio echo sounding data from 1970, provided from the Scott Polar Research Institute, shows that Riiser-Larsenisen has an average thickness of around 300 m, with generally larger thicknesses west of Kvitkuven. The bulk of the inland ice around Vestfjella is 700-1200 m thick. Observed ice thicknesses of Stancomb-Wills Ice Stream range from 135 to 241 m, with no systematic decrease towards the ice front. (Auth. mod.)

F-35871

Gjessing, Y., Wold, B., **Absolute movements, mass balance and snow temperatures of the Riiser-Larsenisen Ice Shelf, Antarctica,** *Oslo. Norsk Polarinstitutt. Skrifter,* 1986 No.187, p.23-31, 27 refs.

Accumulation, deformation, absolute velocity, and snow temperatures at 10 m depth have been measured on Riiser-Larsenisen. Accumulation was measured at several points between the ice front and the grounding line, as well as on the top of an ice dome, for the period 1977-1979. Snow density varied from 470 kg/cu m to 510 kg/cu m, and the mean annual accumulation for twelve points on flat ice shelf was 608 kg/sq m/yr. At the top of the 200 m high dome the mean accumulation was only 416 kg/sq m/yr. The velocities varied from 130 m/yr some 10 km from the grounding line to 110 m/yr near the ice front. Bottom melting is about 80% of the total 'ablation' if the ice shelf is in a steady state. Snow temperatures at 10 m depth were measured on the ice shelf, on an ice dome, and at higher elevations inland. The temperature decreases from -16.8 C near the ice front to -19.2 C near the grounding line. At 695 m a.s.l. a few km inland from the grounding line the temperature was -17.7 C, and on the ice dome it was -15.4 C and -16.4 C at 95 and 200 m a.s.l. respectively. These measurements indicate that the mean annual air temperatures, estimated from 10 m deep snow temperatures, apply only to a boundary layer immediately above the surface of the snow. (Auth. mod.)

F-35872

Orheim, O., **Oxygen isotopes and accumulation rates at Riiser-Larsenisen, Antarctica,** *Oslo. Norsk Polarinstitutt. Skrifter,* 1986 No.187, p.33-47, 23 refs.

Measurements of delta O-18 and beta-activity on eight cores covering up to 20 years of precipitation show that the mean multi-year mass balance at Riiser-Larsenisen is 0.32 m water equivalent (320 kg/cu m). The Kvitkuven ice rise shows the smallest accumulation rates and inter-annual variability. There are no significant correlations in year-to-year variations in accumulation between the eight cores, or between the results at Riiser-Larsenisen and the records at the nearby stations. The mean delta O-18 variations correlate closely with mean annual temperatures, with a relationship=1.3 per mill C. This agrees well with results from the Antarctic Peninsula. Mean annual temperatures and mean delta for all sites at Riiser-Larsenisen are -17.2 C and -20.2 per mill respectively. Temperature observations and monthly measurements of delta-concentrations in precipitation at Halley Station show that the conditions there are similar to those of Riiser-Larsenisen, with means for different periods of -18.3 C and -19.7 per mill, respectively. However, the precipitation data show higher variability in delta O-18 than the snow firn sections. (Auth. mod.)

F-35874

Andrews, J.T., Fulton, R.J., **Inception, growth and decay of the Laurentide Ice Sheet,** *Episodes,* Mar. 1987 10(1), p.13-15, 38 refs.

The link between the antarctic ice sheet and global sea levels is of immense importance to society, as concern grows about a possible worldwide rise of the oceans. One approach to this problem is to study the ice sheet that covered much of North America during the last glacial period. The authors review here some aspects of the birth, growth and disintegration of the Laurentide Sheet. (Ed.)

F-35875

Hughes, T.J., **Deluge II and the continent of doom: rising sea level and collapsing antarctic ice,** *Boreas,* 1987 16(2), p.89-100, 38 refs.

Many cultures in both the Old and New Worlds have preserved legends of a Great Flood. In the Biblical deluge, 'the springs of the great deep broke through and the sluices of heaven opened' (Genesis 7:11). The rise in sea level, as opposed to prolonged rainfall, is a con-

ceivable cause of global flooding because the last stages in collapse of late Wisconsin/Weichselian ice sheets occurred in the late prehistorical period, from 8,000 to 6,000 B.C. A possible mechanism that might collapse large parts of ice sheets in a short time is found in Jakobshavns Isbrae, which drains the west-central part of the Greenland Ice Sheet. This mechanism, called the Jakobshavns Effect, is described and its possible role in Holocene collapse of former Northern Hemisphere ice sheets (Deluge I) and future collapse of parts of the Antarctic Ice Sheet (Deluge II) is examined. Rapid global flooding by this mechanism is extremely unlikely; however, the information needed to eliminate the possibility is lacking. (Auth.)

F-35920

Brooks, R.L., **Ice sheet altimetry,** *U.S. National Aeronautics and Space Administration. Contractor report,* Mar. 1981 NASA-CR-156877, 30p. N81-31605.

NASA Wallops Flight Center is currently designing on improved ice sheet tracking capability to be incorporated into future satellite altimeters. The GeoScience Research Corporation (GSRC) has been assisting WFC personnel to provide ice sheet topography parameters and to evaluate the Seasat altimeter performance over the Antarctic and Greenland ice sheets.

F-35934

Gordon, A.L., **Review of observations carried out by american specialists during the Soviet-American expedition "Weddell-POLEX-81"** [Obzor issledovaniĭ vypolnennykh amerikanskimi spetsialistami po materialam sovetsko-amerikanskoĭ ekspeditsii "Ueddell-POLEKS-81"], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.27-37, In Russian. 4 refs.

Articles published by American scientists participating in a Soviet-American expedition carried out on board the Soviet ship *Mikhail Somov* during Oct.-Nov., 1981, in the ice-covered regions of the southern ocean, are reviewed. The topics investigated include: physical oceanography, sea ice and the atmospheric layer above it, biogenic elements and primary productivity, and the distribution of plankton.

F-35935

Chuguĭ, I.V., **Ice conditions in the "Weddell-POLEX-81" study arrea** [Ledovye usloviia v raĭone provedeniia eksperimenta "Uedell-POLEX-81"], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.37-41, In Russian.

The progress of the Soviet ship *Mikhail Somov* in the Weddell Sea during Oct.-Nov., 1981, a period in which the drift-ice belt is at its widest, is discussed. Data on ice conditions during the entire cruise are presented in a chart and described, beginning with latitude 56 deg 15'S 03 deg 38'E, on Oct. 20th, where the pack ice showed 1-3 points, increasing to 10 points at 59 deg 15'S 5 deg 10'E when the ship entered a zone of ice 100-120 cm thick. This condition extended southward for 150 miles, as confirmed by satellite data. The ship's mean speed in different packing conditions consisted of 2.6 knots, slowing down to 2.1 knots in pack ice of 8-10 points.

F-35944

Proshutinskiĭ, A.IU., Chuguĭ, I.V., **Ice conditions during the *Mikhail Somov* cruise in a Soviet antarctic expedition** [Osobennosti ledovykh usloviĭ pri plavanii nes *Mikhail Somov* v period Sovetskoĭ antarkticheskoĭ ekspeditsii], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.75-78, In Russian.

A study of ice dynamics in the Pacific and Indian oceans along the antarctic coast on board the *Mikhail Somov* in summer 1981-1982 is discussed. The following was found: the northern edge of the ice mass in the Cosmonaut Sea had moved significantly southward in relation to its former location of many years; in Dec. 1981, the width of the fast ice belt near Molodezhnaya Station did not exceed 60 miles, by Apr. 1982 all ice had disappeared; in the Davis Sea, some ice was seen in Jan. 1982 and none in Feb., Ice beginning to form again toward the end of Mar.; near Leningradskaia Station, the navigation through the fast ice was easy at the end of Jan. and beginning of Feb.; near Russkaya Station, in the Pacific Ocean, the summer was unusually mild, with air temperatures ranging between 2 and 7C, and the ship drifted at a speed of 0.4-0.5 knots, with an easterly wind of 15-17 m/s. It is concluded that in this area the ice dynamics are strongly linked to the wind regime, and that there is a greater stability in the Pacific ice mass than in the seas of East Antarctica.

F-35946

Bagriantsev, N.V., Popov, I.K., Potapov, V.A., **Estimate of number of icebergs in the southern ocean** [Ob otsenke kolichestva aĭsbergov v IUzhnom okeane], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.85-87, In Russian. 3 refs.

From Dec. 1983 to Apr. 1984 the Soviet ship *Professor Vize* circumnavigated Antarctica between 60 and 70S, at 15 knots/h, conducting a study of iceberg occurrence in the area. Results, some presented in a table, indicate the presence of approximately 50 thousand icebergs, of an average height of 30 m. Average fresh ice density is found to be 920 kg/cu m.

F-35949

Romanov, A.A., **Basic regularities of the ice process development in the southern ocean** [Osnovnye zakonomernosti razvitiia ledovykh protsessov IUzhnogo okeana], *Problemy Arktiki i Antarktiki; sbornik stateĭ,* 1986 Vol.62, p.28-35, In Russian. 13 refs.

In this study, reviewing regularities in ice formation and development in the southern ocean, two tables and a chart are presented and discussed. They show the following: long period averages of the occurrence of pack ice propagation in the world ocean; mean, maximum and minimum monthly extent of drift ice in the southern ocean, 1964-1980; and ice areas during maximum, middle and minimum ice cover development in the Atlantic, Pacific and Balleny regions. Also briefly considered is the interrelationship of atmospheric circulation and ice cover formation.

F-36008

Martin, S., Holt, B., Cavalieri, D.J., Squire, V., **Shuttle Imaging Radar B (SIR-B) Weddell Sea ice observations: a comparison of SIR-B and scanning multichannel microwave radiometer ice concentrations,** *Journal of geophysical research,* June 30, 1987 92(C7), p.7173-7179, 14 refs.

The October 1984 Shuttle Imaging Radar B (SIR-B) flight made three radar passes over the Weddell Sea ice, providing the first high-resolution look at the Weddell marginal ice zone properties. Using these data, this paper discusses the effect of ocean waves on the radar return at the ice edge and compares ice concentrations derived from the SIR-B with coincident concentrations from the Nimbus 7 scanning multichannel microwave radiometer (SMMR). The comparison of the SIR and SMMR concentrations is possible because SIR cross-track width and the diameter of the SMMR 37-GHz integrated field-of-view are both about 30 km. The SIR ice concentrations are computed in two ways: first, using a training area classification scheme at the Jet Propulsion Laboratory (JPL); second, using a manual classification method at the Scott Polar Research Institute. The SMMR ice concentrations are calculated using the Goddard Space Flight Center algorithm. At the ice edge, where there were no coincident SMMR data and where ice bands predominated to yield an ice con-

centration of the order of 10% or less, comparison of the two different analysis techniques on the same images showed that, for the JPL technique to avoid classifying some of the open water as ice, two classes of open water must be defined. These two classes accounted for the rougher ocean surface upwind of the bands and the smoother downwind surface. In the ice interior, comparison of the coincident SIR and SMMR ice concentrations shows that for concentrations greater than 40%, which was the smallest concentration jointly observed, the mean difference between the two data sets for 12 points is 2% and the standard deviation is 7%. (Auth.)

F-36029

Cragin, J.H., Gow, A.J., Kovacs, A., **Chemical fractionation of brine in the McMurdo Ice Shelf, Antarctica,** *Journal of glaciology,* MP 2239, 1986 32(112), p.307-313, With French and German summaries., 21 refs. For different source see 38-688 or 13F-28806.

During the austral summers of 1976-77 and 1978-79, several ice cores were taken from the McMurdo Ice Shelf brine zone to investigate its thermal, physical, and chemical properties. Chemical analyses of brine samples from the youngest (uppermost) brine wave show that, except for the advancing front, it contains sea salts in normal sea-water proportions. Further inland, deeper and older brine layers, though highly saline (S>200 per mill), are severely depleted in (SO4)2-/Na+ ratio being an order of magnitude less than that of normal sea-water. Consideration of the solubility of alternative salts, together with analyses of Na+, K+, Ca2+, Mg2+, (SO4)2-, and Cl- concentrations, shows that the sulfate depletion is probably due to selective precipitation of mirabilite, Na2SO4.10H2O. The location of the inland boundary of brine penetration is closely related to the depth at which the brine encounters the firn/ice transition. However, a small but measurable migration of brine is still occurring in otherwise impermeable ice; this is attributed to eutectic dissolution of the ice by concentrated brine as it moves into deeper and warmer parts of the McMurdo Ice Shelf. (Auth.)

F-36030

Alley, R.B., **Three-dimensional coordination number from two-dimensional measurements: a new method,** *Journal of glaciology,* 1986 32(112), p.391-396, 10 refs., With French and German summaries.

The average three-dimensional coordination number, *n3,* is an important measure of firn structure. The value of *n3* can be estimated from *n2,* the average measured two-dimensional coordination number, and from a function that depends only on the ratio of average bond radius to grain radius in the sample. This method is easy to apply and does not require the use of unknown shape factors or tunable parameters. Values of *n3* versus density for "Upstream B" on the Siple Coast are plotted and shown. (Auth. mod.)

F-36031

Alley, R.B., Perepezko, J.H., Bentley, C.R., **Grain growth in polar ice: Pts. 1 and 2,** *Journal of glaciology,* 1986 32(112), p.415-433, 84 refs., With French and German summaries.

In the first part of this article, the theory is developed of grain growth in ice that is not deforming rapidly—as in central Greenland or Antarctica—and in the second part, this theory is used to explain observations from glacial ice. These observations are summarized as follows: the high concentration of soluble impurities in Wisconsinan ice from the Dome C ice core causes the small grain-sizes observed in that ice. Microparticles have little effect on grain growth in ordinary ice. In ice layers that appear dirty owing to concentrations of volcanic tephra (such as in the Byrd Station ice core) or of morainal material, microparticles reduce grain-growth rates significantly. The relatively high vapor pressure of ice allows rapid growth and high mobility of intergranular necks, so grain growth in firn is limited by boundary migration rather than by neck growth. Bubbles formed by pore close-off at the firn-ice transition are less mobile than grain boundaries, causing bubble-boundary separation whenever geometric constraints are satisfied; however, such separation reduces grain-growth rates by only about 10%. The observed linear increase of grain area with time is thus predicted by theory, but the growth rate depends on soluble-impurity concentrations as well as on temperature. (Auth. mod.)

F-36032

Jacobs, S.S., MacAyeal, D.R., Ardai, J.L., Jr., **Recent advance of the Ross Ice Shelf, Antarctica,** *Journal of glaciology,* 1986 32(112), p.464-474, Refs. p.472-473., With French and German summaries.

The seaward edge of the Ross Ice Shelf advanced northward at a minimum average velocity of 0.8 km/a between 1962 and 1985. That advance approximated velocities that have been obtained from glaciological data, indicating little recent wastage by iceberg calving. West of long. 178 E, the ice shelf has attained its most northerly position in the past 145 years, and has not experienced a major calving episode for at least 75 years. Calving may occur at more frequent intervals in that sector, which also overlies the warmest ocean currents that flow into the sub-ice-shelf cavity. Available information on ice-shelf advance, thickness, spreading rate, and surface accumulation indicates a basal melting rate around 3 m/a near the ice front. These data and independent estimates imply that basal melting is nearly as large a factor as iceberg calving in maintaining the ice-shelf mass balance. In recent years, the Ross, Ronne, and Filchner Ice Shelves have contributed few icebergs to the southern ocean, while projections from a contemporaneous iceberg census are that circumpolar calving alone may exceed accumulation on the ice sheet. (Auth. mod.)

F-36033

Boulton, G.S., Spring, U., **Isotopic fractionation at the base of polar and sub-polar glaciers,** *Journal of glaciology,* 1986 32(112), p.475-485, 21 refs., With French and German summaries.

The melting of ice and the subsequent production of regelation ice from the melt water in a large-scale closed system beneath sub-polar and polar glaciers produces progressive fractionation between the melt water and the regelation ice derived from it. A theory is developed which predicts the change of isotopic composition in regelation ice in a subglacial zone of freezing and in the water from which it is derived. The theory is tested against data from the Byrd Station bore hole in West Antarctica, and applied to explain features of the isotopic composition in several other glaciers where thick sequences of regelation ice have formed. The principal conclusions are drawn. (Auth. mod.)

F-36034

Pettre, P., **Accumulation distribution in Terre Adélie, Antarctica: effect of meteorological parameters,** *Journal of glaciology,* 1986 32(112), p.486-500, 23 refs., With French and German summaries.

Along the 1040 km extending from Cape Prud'homme, near Dumont d'Urville Station, to Dome C, the variations in annual accumulation can be analyzed by a division of the entire data set into three subsets depending on the types of measurements and the character of the spatial distribution. Along the first 33 km, from the coast to stake E40, annual measurements show considerable inter-annual variability, 52% of which can be explained by the spatio-temporal homogeneity of the balance distribution. From stake E40 to stake R60, a distance of 170 km, the almost periodic oscillations in the accumulation with a wavelength close to 40 km can be explained by the formation of a gravity-inertia wave, disturbing the geostrophic equilibrium, occurring at the break in slope 200 km from the coast. The very low values of

accumulation for stakes D55 and D58S show that the oscillations were almost stationary during the study period (about 25 years). Finally, along the 840 km from stake R60 to Dome C a decrease in accumulation resulting from the decrease in mean temperature can be observed. (Auth. mod.)

F-36035

Chambers, J.L.C., Wilson, C.J.L., Adamson, D.A., **Crystallographic study of the perennially frozen ice surface of Patterned Lake, Framnes Mountains, East Antarctica,** *Journal of glaciology,* 1986 32(112), p.520-526, 10 refs., With French and German summaries.

Interlocking rectangular ice patterns, with dimensions of several meters, on the surface of a perennial frozen lake in East Antarctica can be related to a strong crystallographic orientation in the underlying ice. Most of the surface patterns are characterized by parallel centimeter-scale ridges and furrows that correspond to an aggregate of tabular-shaped grains. Grain elongation is parallel to the basal plane. The *c*-axis distribution within each ice pattern lies in a horizontal plane. It defines a discrete maximum perpendicular to the surface ridges and to the long axis of the rectangular pattern. Areas exhibiting no patterning are composed of variably orientated ice grains. The strong *c*-axis horizontal orientation and the distinctive morphology of these ice patterns are interpreted as having developed by a geometric enhancement over a long period of time. (Auth.)

F-36036

Stolle, D.F.E., Mirza, F.A., **Finite-element simulation of the thermal regime of the Erebus Glacier Tongue, Antarctica,** *Journal of glaciology,* 1986 32(112), p.530-534, 8 refs., With French and German summaries.

Finite-element method is used to determine the temperature distribution within the Erebus Glacier Tongue based on information from short-term observations. It is shown that, provided the up-stream temperature profile along the depth is known, steady-state assumptions are reliable for computing the temperature field within most of the ice mass at any given time for a glacier tongue. Numerical results from analyses of the Erebus Glacier Tongue also indicate that the main transport of heat is through advection as expected and, hence, a realistic estimate of the velocity field becomes important. (Auth.)

F-36066

Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 1986, **Proceedings,** *Annals of glaciology,* 1987 Vol.9, 264p., For individual papers see 41-4426 through 41-4465 or C-36068, C-36070, C-36077, C-36080, F-36067, F-36071 through F-36076, F-36079, G-36078, and L-36069.

The Symposium attracted 91 participants from 17 countries. Forty of the presented papers are included in this volume along with abstracts of 12 papers presented but not published in this volume and 17 papers accepted but not presented at the Symposium. Topics ranged from sea ice to ice sheets, glaciers, icebergs, ice shelves, firn, and earthquakes with ice streams, occurring in the Arctic Ocean, the Antarctic Ocean and Continent, Greenland, and the Canadian Archipelago. Ground and airborne radio echo sounding, SAR, satellite-borne altimetry, and seismic sounding are among the techniques used to examine and measure these phenomena.

F-36067

Alley, R.B., **Texture of polar firn for remote sensing,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.1-4, 14 refs.

Knowledge of the texture of polar firn is necessary for interpretation of remotely sensed data. Dry polar firn is an irregularly stratified, anisotropic medium. Grains in firn may be approximated as prolate spheroids with average axial ratios as high as 1.2 or greater and with a preferred orientation of long axes clustered around the vertical. Such elongate grains are preferentially bonded near their ends into vertical columns, so that grain bonds show a preferred horizontal orientation. The grain-size distribution is similar in most firn and the normalized distribution is stationary in time, but the distribution is somewhat different in depth hoar. Fluctuations of firn properties are large near any depth, but decrease with increasing depth. With increasing depth, anisotropy of surfaces decreases, bond size relative to grain size decreases slightly, and number of bonds per grain and fraction of total grain surface in bonds increase. Grain size increases linearly with age below 2 to 5 m, but increases more rapidly in shallower firn. Sterologic quantities are calculated from thin sections of ice taken from site 4530, ice stream A, West Antarctica. Results are shown in tables and diagrams. (Auth. mod.)

F-36071

Fujii, Y., Yamanouchi, T., Suzuki, K., Tanaka, S., **Comparison of the surface conditions of the inland ice sheet, Dronning Maud Land, Antarctica, derived from NOAA AVHRR data with ground observation,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.72-75, 6 refs.

The surface conditions of the inland ice sheet in east Dronning Maud Land, Antarctica, are derived from the NOAA-7 AVHRR data received at Showa Station and then compared with the ground observations which were collected in Nov. 1984 along a 243 km long traverse route at altitudes ranging from 2700 to 3400 m a.s.l. The variations in the AVHRR data are well related to the distribution of glazed surfaces. The areas with lower albedo, higher surface temperature, lower ratio of channel 2/channel 1, and lower T4-T5 coincide with the areas where a glazed surface has developed. This result is attributed to the fact that the glazed surface is composed of a multilayered ice crust and that its radiative and thermal properties are closer to ice than to snow. The present study shows that the NOAA AVHRR data are useful for distinguishing bare ice, glazed surfaces, and snow surfaces of the antarctic ice sheet. (Auth.)

F-36072

Jacka, T.H., Allison, I., Thwaites, R., Wilson, J.C., **Characteristics of the seasonal sea ice of East Antarctica and comparisons with satellite observations,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.85-91, 18 refs.

A cruise to antarctic waters from late Oct. to mid Dec. 1985 provided the opportunity to study characteristics of the seasonal sea ice from a time close to that of maximum extent through early spring decay. The area covered by the observations extends from the northern ice limit to the antarctic coast between long. 50 E and 80 E. Shipboard observations included ice extent, type and thickness, and snow depth. Ice cores were drilled at several sites, providing data on salinity and structure. The observations verify the highly dynamic and divergent nature of the antarctic seasonal sea-ice zone. Floe size and thickness varied greatly at all locations, although generally increasing from north to south. A high percentage of the total ice mass exhibited a frazil crystal structure, indicative of the existence of open water in the vicinity. The ground based observations are compared with observations from satellite sensors. The remote sensing data include the visual channel imagery from NOAA 6, NOAA 9, and Meteor 11. Comparisons are made with the operational ice charts. (Auth.)

F-36073

Orheim, O., Lucchitta, B.K., **Snow and ice studies by thematic mapper and multispectral scanner Landsat images,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.109-118, 12 refs.

Digitally enhanced Landsat Thematic Mapper (TM) images of Antarctica reveal snow and ice features to a detail never seen before in satellite images. The 6 TM reflective spectral bands have a nominal spatial resolution of 30 m, compared to 80 m for the Multispectral Scanner (MSS). TM bands 2-4 are similar to the MSS bands. TM infra-red bands 5 and 7 discriminate better between clouds and snow than MSS or the lower TM bands. They also reveal snow features related to grain-size and possibly other snow properties. These features are not observed in the visible wavelengths. Large features such as flow lines show best in the MSS and lower TM bands. Their visibility is due to photometric effects on slopes. TM thermal band 6 has a resolution of 120 m. It shows ground radiation temperatures and may serve to detect liquid water and to discriminate between features having similar reflectivities in the other bands, such as blue ice. Repeated Landsat images can be used for sophisticated glaciological studies. By comparing images from 1975 and 1985, flow rates averaging 0.72 km/a, and mean longitudinal and transverse strains of respectively .0013/a and 0.13/a have been measured for Jutulstraumen, Dronning Maud Land. (Auth.)

F-36074

Mae, S., Yoshida, M., **Airborne radio echo-sounding in Shirase Glacier drainage basin, Antarctica,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.160-165, 13 refs.

Airborne radio echo-sounding was carried out in order to measure the thickness of the ice sheet in the shirase Glacier drainage basin and map the bedrock topography. It was found that the elevation of bedrock was approximately at sea-level from Shirase Glacier to 100 km up-stream of the glacier and thereafter it was 500-100 m higher. Investigation of the echo intensity reflected from the bedrock indicates that at ice thicknesses less than 1000 m absorption was about 5.2 dB/100 m, but at greater ice thicknesses echo intensity did not depend upon the ice thickness but became approximately constant. Where ice thicknesses were greater than 1000 m in the main flow area of the Shirase Glacier drainage basin, the reflection strengths of about 9 dB were greater than outside the basin. Since the increase in echo intensity was considered to be due to the existence of water, the strong echo observed in the main part of the basin supported the hypothesis that the base of the basin was wet and the ice sheet was sliding on the bedrock. (Auth.)

F-36075

Musil, G.J., Doake, C.S.M., **Imaging subglacial topography by a synthetic aperture radar technique,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.170-175, 14 refs.

A synthetic aperture radar (SAR) technique has been used to image part of the grounding-line region of Bach Ice Shelf in the Antarctic Peninsula. The radar was sledge-mounted and operated in a pulsed mode with a carrier frequency of 120 MHz. The coherently detected output was recorded photographically as in-phase and quadrature components. Because the system was essentially stationary for each measurement, there was no doppler information about the reflecting points as in the more commonly used airborne and satellite-based SARs. Instead, the phase history was used directly to identify point targets by a correlation method. Three sounding runs were carried out over the grounding line to give views of the area from separate directions. An aperture length of 104 m was necessary to achieve 8 m resolution in the along-track direction for an ice thickness of 290 m. The mapped swath was 88 m wide. Corrections to the data were made to allow for density variations and absorption in the ice. The back-scatter coefficient showed greater variations in echo strength over grounded ice compared with floating ice and texture analysis of the radar image revealed a statistically significant difference between these two regimes. (Auth.)

F-36076

Orheim, O., **Evolution of under-water sides of ice shelves and icebergs,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.176-182, 18 refs.

A systematic program of side-scan sonar and plumb-line soundings was carried out in the Weddell Sea area in 1985 to measure the under-water sides of ice shelves and icebergs. From these observations the following model is suggested for the evolution of the ice front: (1) initial stage: fracturing of the ice shelves takes place along smooth, curvilinear segments with vertical faces. (2) Formative stage: the freshly formed vertical face is eroded both by wave and swell action around the water line, by small calvings from the undercut, overhanging subaerial face, and by submarine melting. The melting has a minimum at 50-100 m depth and increases with depth to a rate of around 10 m/a at 200 m. This is about twice the rate of erosion at the water line. (3) Mature stage: this stage is reached after a few years of exposure. The backward erosion of the face leads to a shape with a prominent under-water "nose" with a maximum projection to more than 50 m at 50-100 m depth. The ramp above this slopes upwards to meet the vertical wall about 5 m below the water line. The ice below the nose is melted back beyond the above-water face. There is no net buoyancy and ice shelves at this mature stage are generally not up-warped at the front.

F-36079

Yoshida, M., Yamashita, K., Mae, S., **Bottom topography and internal layers in east Dronning Maud Land, East Antarctica, from 179 MHz radio echo-sounding,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.221-224, 13 refs.

Extensive echo-sounding was carried out in east Dronning Maud Land during the 1984 field seasons. A 179 MHz radar with separate transmitting and receiving antennae was used and the echoes were recorded by a digital system to detect minute reflections. The results gave cross-sections of the ice sheet along traverse routes from lat. 69 S to 75 S. Detailed observations on the ground at Mizuho station showed that there was elliptical polarization in the internally reflected echoes when two antennae, kept in parallel with each other, were rotated horizontally. The internal echoes were most clearly distinguished when the antenna azimuth was oriented perpendicular to the flow line of the ice sheet. The internal echoes with a high reflection coefficient were detected at depths of 500-700 m and 1000-1500 m at Mizuho station. Since a distinct internal echo at a depth of 500 m coincides with a 5 cm thick volcanic ash-laden ice layer found in the 700 m ice core taken near the observation site, these echoes may correspond to the acidic ice layers formed by past volcanic events in east Dronning Maud Land. (Auth.)

F-36081

Russell-Head, D.S., Budd, W.F., Moore, P.J., **Casey snow runway data report, 1983-84,** *Melbourne. University. Programme in Antarctic Studies. MUPAS report,* Apr. 1984 No.63, 98p.

This report tabulates data collected at the proposed site of the Casey compressed snow runway during the 1983-84 summer season. The data refer generally to snow properties although the meteorological data, which was collected primarily as a record of the conditions

experienced by the snow, stand also as a weather record for the period. The results of studies on snow stratigraphy, density and particle size distributions are tabulated for the *in situ* material, new and aged drift snow, compacted natural snow, processed snow, and compacted processed snow. Rammsonde and Scala penetrometer tests on the same range of snow are also tabulated as are the results of California Bearing Ratio tests. The performance of a 200 mm thick test-pavement was assessed by a 600 mm diameter plate loaded to 16.2 Mg. The settlement during a 2.5 h test period is tabulated. (Auth. mod.)

F-36082

Russell-Head, D.S., Budd, W.F., Moore, P.J., **Casey snow runway tests, 1983-84,** *Melbourne. University. Programme in Antarctic Studies. MUPAS report,* May 1984 No.64, 111p., 8 refs.

This report describes the methods and equipment used to collect data at the proposed site of the Casey compressed snow runway during the 1983-84 summer season, and includes some analysis of the data obtained. The main purpose of the snow testing work was to assess the condition and strength of the *in situ* snow and of snow processed to form a pavement. The stratigraphy, density and particle size distributions for the *in situ* material, new and aged drift snow, compacted natural snow, processed snow, and compacted processed snow were obtained. Rammsonde and Scala penetrometer tests on the same types of snow were also obtained. Snow strength was assessed by California Bearing Ratio (CBR) tests. The results of the 1983-84 testing program demonstrate that a pavement strong enough to support C-130 aircraft loads can be constructed at the Lanyon Junction site with the types of snow-processing and road working-equipment used for the trials. (Auth. mod.)

F-36103

Boutron, C.F., Patterson, C.C., Petrov, V.N., Barkov, N.I., **Preliminary data on changes of lead concentrations in antarctic ice from 155,000 to 26,000 years BP,** *Atmospheric environment,* 1987 21(5), p.1197-1202, 19 refs.

Concentrations of lead (Pb) have been measured by ultraclean Isotope Dilution Mass Spectrometry in 6 sections of the 2083 m Vostok deep antarctic ice core which integrates some 155,000 years. Lead contamination of 15,000-32,000 pg Pb/g existed on the outside of the cores, but measured concentrations decreased abruptly along a radius from the outside to the center of the cores, establishing interior values in the 2-40 pg Pb/g range. These interior data show that natural concentrations of Pb have varied strongly in antarctic ice during the last 155,000 years: Pb values were high during the end of the ice age (Illinois) which preceded the last interglacial and during the Last Glacial Maximum; they were low during the last interglacial and most of the last ice age (Wisconsin). Soil dust appears to be the major source of natural Pb, but the volcanic contribution is found to be significant during low Pb time periods. (Auth.)

F-36130

Whillans, I.M., Bolzan, J., Shabtaie, S., **Velocity of ice streams B and C, Antarctica,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8895-8902, 16 refs.

The essential difference between ice stream and inland ice and the cause of ice streaming are not known. In order to study these problems, velocities have been measured on and near ice streams B and C by repeated tracking of TRANSIT satellites. The results confirm the difference in mode of flow between fast on ice stream B and slow on the interstream ice ridges. Also as expected, ice stream C is nearly stagnant, which with other evidence of formerly fast flow confirms its recent slowing and current thickening. The drainage of ice stream B has a negative balance equivalent to thinning by 0.15 m/yr over the entire catchment. The lower portion of the ice stream is thickening at about 2 m/yr, but the overall behavior is thinning. This general thinning is probably partly due to progressive extension of the ice stream into inland ice. The transition from inland ice to ice stream seems to occur irregularly both spatially and in time, with rafts of inland ice being carried into the ice stream and slowly incorporated. (Auth.)

F-36163

Boutron, C.F., Patterson, C.C., **Relative levels of natural and anthropogenic lead in recent antarctic snow,** *Journal of geophysical research,* July 20, 1987 92(D7), p.8454-8464, 43 refs.

Concentrations of lead have been measured by ultraclean isotope dilution mass spectrometry in large blocks of surface snow collected along a 433-km coast-interior axis in East Antarctica and near the geographic south pole. Slight contamination existed on the outside of the blocks, but concentration profiles from their exteriors to their interiors indicate that lead concentrations in the innermost parts of the blocks do represent the original concentrations in present-day antarctic snow. Geographical variations of lead concentrations appear to be mainly due to local emissions from Dumont d'Urville and Amundsen-Scott stations. The globally significant lead concentration in present-day antarctic snow is found to be about 2 pg Pb/g. The corresponding value in antarctic air is estimated to be about 7 pg Pb/cu STP, which is approximately fivefold larger than total natural lead contributed by soil dusts, volcanoes and sea salts. A tentative temporal curve of globally significant lead concentrations in antarctic ice and snow for the last 13,000 years is given. It shows concentrations of about 0.4 pg Pb/g throughout most of the Holocene, with recent fivefold increases to about 2 pg Pb/g today. The general picture is then that four-fifths of total lead in the antarctic troposphere today is anthropogenic. (Auth.)

F-36187

Brunk, K., Staiger, R., **Follow-up stake measurements on a blue ice field in the Borg Massif, New Schwabenland, Antarctica** [Nachmessungen an Pegeln auf einem Blaueisfeld im Borgmassiv, Neuschwabenland, Antarktis], *Polarforschung,* 1986 56(1/2), p.23-32, In German with English summary. 8 refs.

In Jan:/Feb. 1985 a German-South African expedition had the opportunity to repeat measurements made by means of stakes planted in 1951 (Norwegian-British-Swedish Antarctic Expedition 1949-52) and 1966 (SANAE VII). Although the rediscovery of the old stakes had not been expected, the stakes could be identified and it was possible to derive movement vectors on the basis of old and heterogeneous measurement data. The long-term movement rates established basically confirm and complement the values determined in 1951. The flow rates of 9.1 cm/a to 86.4 cm/a proved to be extremely low. Observations of the stake lengths showed very little accumulation in the fringe areas of the blue ice-field (ca. 0.7 to 2.6 cm/a snow/firn); on bare ice an ablation of 2.6 cm/a water equivalent (2.9 cm/a ice) was measured. The paper begins with a description of the essential conditions for the formation of the blue ice-field. Subsequently the measurements are explained in detail and their results are discussed. (Auth.)

F-36200

Bobin, N.E., Moiseev, B.S., Zemtsov, A.A., **Results of hole drilling with non-freezing fluid at Gornaia base** [Rezul'taty bureniia skvazhiny s primeneniem nizkotemperaturnoĭ zalivochnoĭ zhidkosti na baze Gornoĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.81, p.93-101, In Russian.

Experimental drilling on Gornaia base, 73rd km on the Mirnyy-Vostok route, is reported. A thermal drill filled with non-freezing

fluid used for boreholes in ice, and the installation of the portable borehole equipment, are described and illustrated. The operational capabilities of the drill are found to be highly satisfactory; its mechanical speed is reported to surpass 2 m/h.

F-36204

Radok, U., **On the surging potential of polar ice streams. Antarctic surges—a clear and present danger?,** *U.S. Department of Energy. Report,* July 1987 DOE/ER/60197-H1, 62p., Refs. p.58-60.

Antarctic ice streams typically move hundreds of meters in a year. An investigation was carried out to determine whether polar ice streams, like some mountain glaciers, can accelerate their motion from time to time by one or two orders of magnitude in the span of a few years, with appreciable effects on global sea level. Mass gains and losses of the antarctic ice sheet as a whole closely balance one another. The working hypothesis that they do so exactly was used to construct three-dimensional steady-state fields of ice velocity and temperature in broad agreement with the as yet very scant observational record for the ice sheet. Next a numerical model which links the sliding motion of the ice to the energy dissipated by the friction between the ice and the underlying rock, was used to simulate the time-dependent behavior of 8 ice streams representing the full range of antarctic conditions. In contrast to the realistic alternation between fast advances and stagnating retreats which the model had produced for some mountain glaciers known to surge, the modeled ice streams instead went from steady to irregular continuous fast sliding when the prescribed ice deformability was reduced and/or the implied lubrication by frictional heating was increased. Substantial rapid advances did not develop, except as transient phases in two experiments. Possible reasons for the results obtained are presented and discussed. (Auth.)

F-36229

Botnikov, V.N., **Ice conditions during the voyage of *Mikhail Somov* in the Balleny ice massif area** [Ledovye usloviia plavaniia NES *Mikhail Somov* v Ballenskom ledianom massive], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.80, p.115-121, In Russian.

Ice conditions found along the route of the ship *Mikhail Somov* in Feb.-Mar. 1978 are described. A chart showing the massif ice edge on Feb. 10 is discussed; the ice distribution on the eastern side of the massif made navigation very unfavorable on that date. Ice conditions in the years preceding 1978 are considered and, based on that analysis, a recommendation is made concerning the most suitable time for the arrival and unloading of ships at Leningradskaya Station, which is between Feb. 15 and Mar. 15.

F-36231

Voĭnov, G.N., Kuznetsov, I.M., **Navigability of the *Amguema* type ships in the Antarctic during 1977-1978** [Nekotorye osobennosti plavaniia sudna tipa d/e *Amguema* v l'dakh Antarktiki v 1977/78 g], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.80, p.130-132, In Russian. 1 ref.

The navigation speed of ships of different types, in different ice conditions, is discussed. A review of the data collected on the ship *Kapitan Kondrat'ev* is presented, which shows that the ship covered (in summer 1977-1978) 2370 miles in 299 hrs., at an average speed of 7.92 knots. The ship's average speed, mileage, and navigation time in waters with an increasing degree of ice concentration, at 4 different levels, are shown in a table.

F-36232

Kuznetsov, I.M., Voĭnov, G.N., **Ice conditions in Weddell Sea in the spring and summer of 1977-1978** [Ledovye usloviia v more Ueddella v vesenne-letniĭ period 1977/78 g], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.80, p.133-138, In Russian.

Mild ice conditions in the spring and summer of 1977-1978, recorded by the ISZ *Meteor* and the *Kapitan Kondrat'ev* navigating in the Weddell Sea, are discussed. An illustration shows the maximal northern position of ice, measured in Aug., at 50-57S, with the ice edge between 56 and 60S. Ice conditions between Jan. 8 and Feb. 28, 1978, are also illustrated. The mild conditions, which allowed navigation in the Weddell Sea even during the month of Mar. are attributed to the blowing of katabatic winds during ice formation and creating polynyas all along the coast.

F-36233

Kuznetsov, I.M., Voĭnov, G.N., **Unloading operations at Druzhnaya Base in 1977-1978** [Usloviia vygruzki v raĭone bazy Druzhnoĭ v 1977/78 g], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.80, p.139-142, In Russian.

Ice conditions at Druzhnaya Base on Jan. 7-8 and Feb. 25, 1978 are described and illustrated. It is concluded, from data collected by helicopter and ship, that sea operations in the Druzhnaya Base area in 1978 were significantly reduced during the ice formation period. However, navigation in the Weddell Sea was not so impaired.

F-36266

Buckley, R.G., Trodahl, H.J., **Thermally driven changes in the optical properties of sea ice,** *Cold regions science and technology,* Aug. 1987 14(2), p.201-204, 8 refs.

Optical backscattering measurements on first year sea ice in McMurdo Sound have revealed dramatic changes in optical behavior occurring following an air temperature rise from -15 C to -5 C. Ice temperature and salinity profiles, measured during the optical experiments, have identified the source of the change as a rapid drainage of surface brine. (Auth.)

F-36269

Trodahl, H.J., Buckley, R.G., **Light transmission in sea ice,** *New Zealand antarctic record,* 1987 7(3), p.20-22, 1 ref.

The scattering and absorption of sunlight falling on the sea ice cover, which every winter doubles the effective area of the antarctic continent, exerts a strong influence over the weather of the Southern Hemisphere and controls the growth of micorbial communities in the water column and within the ice itself. To develop an understanding of the interaction of light with sea ice, a program was begun to perform *in situ* measurements of the diffusive transport of light in first year sea ice on McMurdo Sound. The past two seasons have seen the completion of the first phase of this study. Knowledge gained from these first phase measurements is briefly outlined. (Auth.)

F-36285

Blankenship, D.D., Bentley, C.R., **Crystalline fabric of polar ice sheets inferred from seismic anisotropy,** *International Association of Hydrological Sciences. Publication,* 1987 No.170, International Symposium [on] the Physical Basis of Ice Sheet Modelling, Vancouver, B.C., Aug. 9-22, 1987. Proceedings. Edited by E.D. Waddington and J.S. Walder, p.17-28, 25 refs., With French summary.

In the future, an important parameter for modelling the dynamics of polar ice sheets will be the crystalline fabric of the constituent ice mass. Compressional (P) waves reflected at wide angles from the base of an ice sheet can be used to obtain a good approximation of both

the mean fabric and mean temperature of that ice sheet. Seismic observations made in the vicinity of Dome C in East Antarctica show that the ice sheet there is transversely isotropic with a vertical axis of symmetry. Assuming the crystals' c-axes are distributed evenly within a vertical cone of apex angle *I*, the limiting fabric structures at Dome C are (a) half isotropic ice and half anisotropic ice with $I=0$ deg, and (b) all anisotropic ice with $I=29$ deg. On the basis of c-axis distributions measured in ice cores from other locations, the most reasonable structure at Dome C is one containing one-third isotropic ice and two-thirds anisotropic ice with $I=20$ deg (corresponding to a total thickness of 3414 m). The seismically estimated mean temperature of the ice sheet (below the firn) is -38 C. (Auth.)

F-36286

Pimienta, P., Duval, P., Lipenkov, V.IA., **Mechanical behavior of anisotropic polar ice,** *International Association of Hydrological Sciences. Publication,* 1987 No.170, International Symposium [on] the Physical Basis of Ice Sheet Modelling, Vancouver, B.C., Aug. 9-22, 1987. Proceedings. Edited by E.D. Waddington and J.S. Walder, p.57-66, 28 refs., With French summary.

Uniaxial and biaxial compression tests on ice samples of the Vostok ice core (Antarctica) were carried out in order to study the flow behavior of anisotropic ice with *c*-axes in a vertical plane. Values of the rheological parameters involved in power law creep are given. It is deduced that the viscosity of Vostok ice for the thinning of annual layers is very high. The results are compared with those obtained with ices with a single maximum fabric. Borehole tilting measurements were analyzed by taking into account the anisotropic power law creep. The possibility of a linear viscosity at low stresses is also considered. Regardless of the value of the exponent of the flow law, dislocation glide appears to be at the origin of the typical fabrics of polar ice. (Auth.)

F-36287

Alley, R.B., Blankenship, D.D., Rooney, S.T., Bentley, C.R., **Continuous till deformation beneath ice sheets,** *International Association of Hydrological Sciences. Publication,* 1987 No.170, International Symposium [on] the Physical Basis of Ice Sheet Modelling, Vancouver, B.C., Aug. 9-22, 1987. Proceedings. Edited by E.D. Waddington and J.S. Walder, p.81-91, 47 refs., With French summary.

Either advance of a glacier over unconsolidated sediments or water-pressure fluctuations in unconsolidated subglacial sediments can trigger sediment deformation and changes in glacier flow and glacier-margin position without further climatic forcing. However, for a wet-based glacier beneath which bedrock erosion balances till transport by continuous subglacial deformation, internal instabilities are less likely and glacier changes that record climatic forcings are more likely. The evidence is presented here that the West Antarctic ice sheet is a modern example of such continuous till deformation, and that other ice sheets, including the Laurentide ice sheet, may have been similar. An ice sheet with continuous till deformation will leave a more regular sedimentary record than one with discontinuous deformation, so careful glacial-geologial studies should allow distinction of these cases for former ice sheets. (Auth.)

F-36289

Grootes, P.M., Stuiver, M., **Ice sheet elevation changes from isotope profiles,** *International Association of Hydrological Sciences. Publication,* 1987 No.170, International Symposium [on] the Physical Basis of Ice Sheet Modelling, Vancouver, B.C., Aug. 9-22, 1987. Proceedings. Edited by E.D. Waddington and J.S. Walder, p.269-281, 33 refs., With French summary.

The contributions of climate, ice sheet thinning, and ice flow to the total change in delta (delta(18)O or deltaD) observed in antarctic cores can be estimated by assuming (a) a uniform, climate-related delta change for Antarctica, based on the central East Antarctic Dome C core, and (b) different time constants for the three contributions. This approach, previously developed for the Ross Ice Shelf delta(18)O profile at J-9, is applied to the Law Dome and D-10 profiles. Evidently Law Dome was an independent dome during the last glacial period, because the surface elevation on Law Dome at which ice at the glacial-interglacial transition in core BHF originated decreased by about 530 m across the transition. Similarly about 1300 m of surface elevation lowering of the origin of ice across the glacial-interglacial transition is shown by the isotopic record in core D-10.

F-36290

Bentley, C.R., **Constraints on models in the Ross Embayment, Antarctica,** *International Association of Hydrological Sciences. Publication,* 1987 No.170, International Symposium [on] the Physical Basis of Ice Sheet Modelling, Vancouver, B.C., Aug. 9-22, 1987. Proceedings. Edited by E.D. Waddington and J.S. Walder, p.313-322, 30 refs., With French summary.

Numerical modelling of ice flow and evolution in the West Antarctic Ross Embayment system must treat a variety of physical characteristics that differ markedly through the system. Gravitational driving forces on the inland ice are balanced largely by the bed drag, but on the ice shelf and in the lower reaches of the ice streams, side drag appears to be dominant. The glacial system responds to applied forces in several ways. Bed deformation probably dominates under active ice streams, and may occur elsewhere under the inland ice, although to a lesser extent. Substantial uncertainties remain about the effective viscosity of a deforming subglacial layer. On the ice shelf Coulomb failure may provide a good model for differential motion across highly crevassed, boundary shear zones. Both the ice shelf and the grounded "ice plain," situated at the transition between ice stream and ice shelf, are characterized by longitudinal and/or transverse spreading. A goal of modelling should be to reproduce the strikingly transient behavior of the Ross ice streams, principally the stagnation of ice stream C some two centuries ago and the apparently rapid present-day expansion of ice stream B. (Auth.)

F-36291

Frolich, R.M., Mantripp, D.R., Vaughan, D.G., Doake, C.S.M., **Force balance of Rutford Ice Stream, Antarctica,** *International Association of Hydrological Sciences. Publication,* 1987 No.170, International Symposium [on] the Physical Basis of Ice Sheet Modelling, Vancouver, B.C., Aug. 9-22, 1987. Proceedings. Edited by E.D. Waddington and J.S. Walder, p.323-331, 15 refs., With French summary.

Data are presented along a 60 km survey network on Rutford Ice Stream, Antarctica. The network follows closely a streamline and is situated above the grounding line. Measurements of velocity, strain rate, surface elevation and ice thickness allow a preliminary interpretation of the flow regime. A prominent feature is a rise in the bed of 500 m, over which the ice must flow. The surface expression of this step is seen in Landsat satellite images as a surface knoll whose shape emphasizes that the flow must be considered using a full three dimensional analysis. Vertical shear stress gradients appear to be important within about 20 km of the knoll. (Auth.)

F-36292
Kellogg, T.B., Kellogg, D.E., **Late Quaternary deglaciation of the Amundsen Sea: implications for ice sheet modelling,** *International Association of Hydrological Sciences. Publication,* 1987 No.170, International Symposium [on] the Physical Basis of Ice Sheet Modelling, Vancouver, B.C., Aug. 9-22, 1987. Proceedings. Edited by E.D. Waddington and J.S. Walder, p.349-357, 18 refs., With French summary.

Field observations and micropaleontological and sedimentological study of the previously unstudied Amundsen Sea continental shelf suggest the following preliminary conclusions bearing on glaciological modelling of the West Antarctic Ice Sheet: (a) the outer continental shelf is relatively shallow (360-460 m) with low relief, in contrast to the inner shelf where deep (>500 m), possibly glacially scoured, troughs occur. Troughs may represent former ice-stream channels. (b) Pine Island Bay cores are composed of silty mud with rare ice-rafted detritus (IRD) and microfossils, suggesting former ice-shelf cover consistent with observed rapid calving-margin recession of Pine Island Glacier. (c) Elsewhere, a thin (<15 cm) sandy mud overlies compact diamicton. In the eastern margin area this upper layer may result from the establishment of the Amundsen Sea polynya <3000 years ago. (d) Grounded ice apparently advanced to the continental shelf margin, perhaps during the late Wisconsin, and grounded or shelf ice probably occupied the Amundsen Sea until recently. (Auth.)

F-36311
Peng, G., Domrös, M., **Statistical studies of the atmospheric circulation of the Northern Hemisphere, hydroclimatic regimes in China and Antarctic ice-snow cover,** *International Association of Hydrological Sciences. Publication,* 1987 No.166, International Symposium [on] Large Scale Effects of Seasonal Snow Cover, Vancouver, B.C., Aug. 9-22, 1987. Proceedings. Edited by B.E. Goodison, R.G. Barry and J. Dozier, p.61-72, 12 refs., With French summary.

On the basis of 10-year monthly and long-term annual data, the connections of different indices of the atmospheric circulation of the Northern Hemisphere and some hydroclimatic regimes in China with the Antarctic ice-snow indices are discussed, using correlation, regression, stepwise regression, power-spectral and cross-spectral analyses. The results show that there are close correlations between some meteorological conditions of the Northern Hemisphere and the Antarctic ice-snow cover, in particular, between the Northwestern Pacific subtropic high or the annual run-off of Yellow River at Sanmenxia station and the ice-snow indices. The strongest correlations often appear with some time lags of the meteorological and hydrological conditions behind the ice-snow variations. The usefulness of these connections for hydroclimatic forecasting is considered. (Auth. mod.)

F-36330
Sivaprasad, K., Petrin, M.F., **Computer simulation for the analysis of radar echo-sounding of polar ice sheets,** *IEEE transactions on geoscience and remote sensing,* Sep. 1987 GE-25(5), p.564-569, 23 refs.

The goal of the work presented here is to model the time-domain reflected radar returns from polar ice sheets so that greater information can be gained from those returns. The results obtained by modeling the ice sheets as lossless and multilayered media are shown to be consistent with the measured results. They also provide insights into the mechanisms affecting the radar returns. In particular, the simulations suggest that the internal reflections in the polar ice sheet are due more to the variation in layer-to-layer permittivity rather than the conductivity. In addition, the best qualitative agreement between the simulations and the observed data was found when the permittivity variations in each layer were varied randomly about the mean dielectric constant of the ice sheet. Radar sounding scope traces of antarctic ice are shown and compared to the derived model. (Auth. mod.)

F-36339
Clarke, G.K.C., **Fast glacier flow: ice streams, surging, and tidewater glaciers,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8835-8841, 59 refs.

An overview is presented of fast flowing glaciers, showing many of the variations that have been noted among different glacier types. Glaciers and ice streams of Greenland and Antarctica serve as examples in the discussions. Jakobshavns Glacier in Greenland is the world's fastest moving glacier at 8,360 m/yr. Rutford Ice Stream and Ice Stream B in West Antarctica flow at rates of 400 and 827 m/yr, respectively. Discussions ensue as to how fast glaciers should flow, and the causes of fast flow and sources of instability.

F-36340
Bentley, C.R., **Antarctic ice streams: a review,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8843-8858, 69 refs.

An ice stream is a part of an inland ice sheet that flows rapidly through the surrounding ice. The "Ross ice streams," which flow through the West Antarctic inland ice into the Ross Ice Shelf, are distinct in character, differing even from other ice streams in the marine ice sheet of West Antarctica. Their surface elevation profiles are low, their bed slopes are low and smooth, and their driving stresses diminish monotonically downglacier. In transverse profile they are broader in relation to ice thickness and exhibit shallower subglacial troughs, than other ice streams. Many models for the fast sliding of glaciers have been applied to the Ross ice streams; most have included in some form a reduction in basal drag resulting from a lesser effective than glaciostatic pressure at the bed. The recent discovery of a very small effective pressure beneath one ice stream consequently has led to some gross errors in the velocities predicted by the models. The difficulty may be resolved if it is true, as recent experiments suggest, that ice stream B, and by extrapolation other Ross ice streams as well, slide on a deforming bed that absorbs most or all of the differential motion between the ice and the bedrock. (Auth.)

F-36341
Kellogg, T.B., Kellogg, D.E., **Recent glacial history and rapid ice stream retreat in the Amundsen Sea,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8859-8864, 16 refs.

Microfossil analyses of core top samples from 20 sites in the eastern and southern Amundsen Sea delimit three biotic provinces, which are related in part to the activity of a large ice stream and modern sea ice distribution. In Recent sediments on the Outer Shelf, planktonic and calcareous benthic foraminifera are abundant, but diatoms are rare. Here, low diatom abundances in sediments are attributed to nondeposition caused by ocean currents. Pine Island Bay sediments are almost barren of microfossils, even though diatoms are abundant in overlying surface waters. The polynya which occupies this area during present-day summers is probably so recent a feature that little or no biogenic sediment has accumulated. Recent sediments in the Eastern Margin Province, between Pine Island Bay and the Outer Shelf, contain abundant diatoms and arenaceous foraminifera. High diatom abundances here probably record the presence of the Amundsen Sea polynya during the last few millennia. The presence of a compact diamicton beneath Recent sediments on the Outer Shelf and in the Eastern Margin Province suggests that grounded ice formerly occupied the Amundsen Sea shelf with ice streams in deep, elongated troughs. These ice streams may have retreated up to 200 km during the Holocene. (Auth.)

F-36342
Shabtaie, S., Whillans, I.M., Bentley, C.R., **Morphology of Ice Streams A, B, and C, West Antarctica, and their environs,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8865-8883, 37 refs.

Airborne radar soundings of the ice sheet surface made in 1984-1985 together with elevations measured by oversnow traverses between 1957 and 1964 have been used to produce a surface elevation map of Ice Streams A, B, and C and much of the region around them. The surfaces of active Ice Streams A and B exhibit a longitudinal ridge-trough topography of uncertain origin. Prominent surface valleys are associated with most of their marginal shear zones. There is a deep subglacial trough beneath the grid northeastern side of Ice Stream A that connects to the subglacial trough beneath Reedy Glacier. Between Ice Streams B1 and B2, the tributaries of Ice Stream B, there is a complex zone containing several regions of undisturbed ice separated by bands of disturbed ice, which suggest that "rafts" of ice are being incorporated into the ice streams. Inactive Ice Stream C differs from the two active streams in surficial and basal characteristics. No elongated ridges and troughs are observed; instead, the ice stream surface exhibits several terraces, including some maxima and minima in elevation. Radar sounding reveals areas where basal echoes are strong and steady, indicating subglacial water, alternating with areas of weaker echoes with short fading lengths. (Auth. mod.)

F-36343
Bindschadler, R.A., Stephenson, S.N., MacAyeal, D.R., Shabtaie, S., **Ice dynamics at the mouth of Ice Stream B, Antarctica,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8885-8894, 39 refs.

Field data collected at the mouth of Ice Stream B show that the flow dynamics of this region are distinctly different than either the major portion of the ice stream upstream or the ice shelf downstream. Surface slopes in this region are as low as ice shelf surface slopes, yet with the exception of patches of ice which may be floating, the ice is grounded. Basal shear stress is negligible. The surface is generally crevasse-free. Features similar to ice rises are observed upstream of the grounding line. The flow is laterally extensive and longitudinally compressive, but there are large local variations of the strain rate from the regional trends. The boundary between the two major tributaries to Ice Stream B is characterized by a band of strain rates much smaller than average. Detailed measurements at the downstream B network confirm that there is a strong correlation between surface topography and strain rates. The strain rates indicate that the undulating topography is locally generated. A velocity profile across the crevassed northern margin shows that the decrease of velocity toward the edge is nearly linear. A calculation of ice stream discharge at this location agrees closely with two rather rough estimates of balance flux and is considerably larger than a third estimate. (Auth. mod.)

F-36345
Blankenship, D.D., Bentley, C.R., Rooney, S.T., Alley, R.B., **Till beneath Ice Stream B. 1. Properties derived from seismic travel times,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8903-8911, 29 refs.

Seismic experiments conducted on Ice Stream B, part of the marine ice sheet of West Antarctica, show a meters-thick layer immediately beneath the 1000-m-thick ice. A seismic experiment consisting of wide-angle reflection profiling along a line parallel to ice stream flow was conducted to determine the properties of this layer. Inversion of seismic travel times yields a compressional wave speed of less than 1700 m/s and a shear wave speed less than 160 m/s for the layer. These very low wave speeds imply that the material in the layer is highly porous and is saturated with water at a high pore pressure. Based on wave speeds in other saturated, unconsolidated sediments, it is suggested that a porosity substantially greater than 0.32, probably around 0.4, and an excess of overburden pressure over pore pressure of only 50 kPa (0.5 bar) characterize the layer at this location. (Auth.)

F-36346
Rooney, S.T., Blankenship, D.D., Alley, R.B., Bentley, C.R., **Till beneath Ice Stream B. 2. Structure and continuity,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8913-8920, 18 refs.

During the 1984-1985 antarctic field season, 8.3 km of high-resolution seismic reflection data were collected in order to image a thin till layer beneath Ice Stream B, West Antarctica. Two parallel seismic reflection lines were oriented transverse to ice flow. These data show that the till layer varies in thickness but is continuous over almost the entire length of the profiles with an average thickness of 6.5 m. The upper surface of the till layer is smooth, but the lower boundary is fluted parallel to flow. These till-filled flutes are as much as 13 m deep and 1000 m across. Nowhere on the profiles can any feature be discerned to penetrate more than a few meters into the ice from the bed. Reflection events from lithified sediments of unknown type are observed to be truncated by the till in an angular unconformity. (Auth.)

F-36347
Alley, R.B., Blankenship, D.D., Bentley, C.R., Rooney, S.T., **Till beneath Ice Stream B. 3. Till deformation: evidence and implications,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8921-8929, 58 refs.

Most of the velocity of ice stream B near the Upstream B cusp (UpB), West Antarctica, appears to arise from deformation of a seismically detected, subglacial till layer that averages 6 m thick. Available evidence indicates that the entire thickness of this till layer is deforming and is eroding subjacent bedrock into flutes parallel to ice flow and hundreds of meters across. The resulting till flux beneath UpB is equivalent to an average erosion rate of about 0.4 mm/yr in the catchment area and suggests that till deltas tens of kilometers long have been deposited at the grounding line during the Holocene. Such deltas should be characterized by partial ice-till decoupling across a water film and by a small ice-air surface slope. (Auth.)

F-36348
Alley, R.B., Blankenship, D.D., Rooney, S.T., Bentley, C.R., **Till beneath Ice Stream B. 4. A coupled ice-till flow model,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8931-8940, 32 refs.

A nonsteady model of an ice stream flowing on deforming till shows that the system responds rapidly and in a stable manner to reasonable marginal perturbations. For the model one-dimensional flow and continuity of ice and till are required; linear viscous till rheology and balance between the driving stress for ice flow and the resistive stress at the bed are assumed. This allows coupled equations to be written for the time rate of change of the ice thickness and the till thickness in terms of these thicknesses and the till viscosity. An analytic, steady state solution for ice stream B shows that till viscosity decreases slowly downstream, probably in response to decreasing effective pressure downstream. Nonsteady numerical experiments with fixed ice thicknesses at the ends show that a marginal perturbation causes a wave of adjustment to travel the length of the ice stream in about 50 years, with a new steady state in about 200 years. Changes in till thickness tend to moderate perturbations in the ice and thus stabilize the system. (Auth.)

F-36349
Fastook, J.L., **Use of a new finite element continuity model to study the transient behavior of Ice Stream C and causes of its present low velocity,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8941-8949, 10 refs.

The finite element technique is used to solve the continuity equation for two modeling experiments which investigate the response of Ice Stream C to changes in the boundary conditions. By comparison of the results of these experiments it is possible to delineate the mechanism responsible for the anomalously low observed velocity. These experiments are (1) the sudden capture of a major portion of Ice Stream C's catchment area by neighboring Ice Stream B and (2) the sudden removal of a sliding bed condition along a major portion of Ice Stream C. The results of these experiments favor the second scenario over the first as being responsible for the present state of Ice Stream C and suggest that the sliding condition on Ice Stream C disappeared approximately 2000 years ago. (Auth.)

F-36350

Doake, C.S.M., **Glaciological studies on Rutford Ice Stream, Antarctica,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.8951-8960, 21 refs.

Rutford Ice Stream drains part of the West Antarctic ice sheet into Ronne Ice Shelf. Much of the drainage basin has a bed well below sea level and could undergo substantial change if a climatic warming were to cause sustained thinning of Ronne Ice Shelf. Snow accumulation data suggest that an accumulation rate of 0.51 mg/sq m/yr is required for balance. Velocities at 5 sites have been calculated using doppler satellite position measurements. When the velocities are combined with cross-sectional areas of the ice stream measured by radio echo sounding, mass flux figures show that drag at the sidewalls and on the base must decrease downstream toward the grounding line. The increasing influence of buoyancy forces on ice stream motion is also shown by the steady rise in the ratio of bedrock depth to ice thickness going downstream along the network. Below the grounding line that was found to cross the middle part of the earlier network is a zone stretching for a further 100 km where it can now be shown that the ice stream is intermittently grounded. In these grounded areas the glacier bed is raised with respect to the surrounding seabed and forms eskerlike features. Surface elevations over the grounded areas are less than 30 m above those needed for hydrostatic equilibrium. (Auth.)

F-36351

Chao, B.F., **Snow load effect on the Earth's rotation and gravitational field, 1979-1985,** *Journal of geophysical research,* Aug. 10, 1987 92(B9), p.9415-9455, 32 refs.

A global, monthly snow depth data set has been generated from the Nimbus 7 satellite observations using passive microwave remote-sensing techniques. In this paper 7 years of data, 1979-1985, are analyzed to compute the snow load effects on the earth's rotation and low-degree zonal gravitational field. A uniform sea level decrease has been assumed in order to conserve water mass. The resultant time series show dominant seasonal cycles. The excitation power of the Chandler wobble due to the snow load is estimated to be about 25 dB less than the power needed to maintain the observed Chandler wobble. The superior quality of the satellite data over conventional data acquired by ground observations and modeling is demonstrated. The role of atmospheric water and the problems arising from the lack of snow load observations over the antarctic and Greenland ice sheets are also discussed. (Auth. mod.)

F-36371

Eraso, A., **Method for predicting subglacial drainage and its prospects with antarctic subpolar glaciers** [Método de predicción del drenaje subglaciar, sus perspectivas en los glaciares subpolares de la Antártida], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.173-183, 13 refs., In Spanish with English summary.

Investigations carried out during Aug.-Sep. 1985 on Werenskiold Glacier, Svalbard, with the object of testing the prediction method of the principal directions of drainage in karst under arctic ice and evaluate the methods' applicability to antarctic ice, are reported. It is concluded that the method in question gives the directional probability of subglacial drainage with a degree of accuracy greater than 98% obtained in Kolmogorov's test, and that it is applicable to marine, subpolar glaciers, such as exist in great numbers on the periphery of Antarctica.

F-36392

Wadhams, P., **Resources potential of antarctic icebergs,** Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.425-447, With Spanish summary. Refs. p.443-447.

The suggestion that antarctic tabular icebergs can be towed to Southern Hemisphere desert locations and used as a source of fresh water and electric power is discussed. The history of this idea is reviewed, as are the physical properties of icebergs which affect their potential for towing; the methods that would be used for detection, propulsion, protection and processing; and the ICETEC technique which would extract power as well as fresh water. It is concluded that the idea may be feasible, but that many problems remain to be solved. (Auth. mod.)

F-36406

Campbell, P., **Antarctic cornucopia,** *Nature,* Oct. 1, 1987 329(6138), p.387.

Remarks are made on the benefits to be derived from collaboration between nations in antarctic research. The example is cited of the important climatic results obtained from the French-Soviet drilling project conducted at Vostok Station between 1980-1985.

F-36407

Sundquist, E.T., **Ice core links CO2 to climate,** *Nature,* Oct. 1, 1987 329(6138), p.389-390, 10 refs.

Results of CO2 data obtained during a joint French-Soviet ice core drilling project at Vostok Station as an indicator of climate change are reviewed and commented on. The 2083 m continuous core was obtained during the years 1980-1985 and contained measurements of O-18 and deuterium throughout its length. It is concluded that the global climate system and carbon cycle are intensely interactive.

F-36408

Jouzel, J., **Vostok ice core: a continuous isotope temperature record over the last climatic cycle (160,000 years),** *Nature,* Oct. 1, 1987 329(6138), p.403-408, 50 refs.

In the context of scarce documentation of historical continental climates, the 2,083-m ice core recovered by the Soviet Antarctic Expeditions at Vostok is of fundamental importance because it fully covers the last glacial-interglacial cycle, back to the ice age that preceded the last interglacial (160 kyr BP) and has been essentially undisturbed by flow conditions. It allows access to many climatic and climate-related parameters. Presented here are continuous data for deuterium throughout the core. The focus first is on the interpretation of this profile in terms of temperature and then this continuous record is examined in the frequency and time domains. The ice record is compared with the oceanic record, with a special emphasis on the last Interglacial Period. For the first time an ice core reveals the large 100-kyr glacial-interglacial cycle and concentration of variance near the Earth's orbit tilt and precession frequencies. (Auth.)

F-36409
Barnola, J.M., Raynaud, D., Korotkevich, E.S., Lorius, C., **Vostok ice core provides 160,000-year record of atmospheric CO2,** *Nature,* Oct. 1, 1987 329(6138), p.408-414, 43 refs.

Direct evidence of past atmospheric CO2 changes has been extended to the past 160,000 years from the Vostok ice core. These changes are most notably an inherent phenomenon of change between glacial and interglacial periods. Besides the major 100,000-year cycle, the CO2 record seems to exhibit a cyclic change with a period of some 21,000 years. (Auth.)

F-36410
Genthon, C., **Vostok ice core: climatic response to CO2 and orbital forcing changes over the last climatic cycle,** *Nature,* Oct. 1, 1987 329(6138), p.414-418, 55 refs.

Vostok climate and CO2 records suggest that CO2 changes have had an important climatic role during the late Pleistocene in amplifying the relatively weak orbital forcing. The existence of the 100-kyr cycle and the synchronism between Northern and Southern Hemisphere climates may have their origin in the large glacial-interglacial CO2 changes. (Auth.)

F-36424
Andermann, I., **Mechanical law of anisotropic rock ice during stationary regime** [Lois du comportement mécanique d'une roche glace anisotrope en régime stationnaire], *France. Centre national de la recherche scientifique. Laboratoire de glaciologie et de géophysique de l'environnement,* 1982 No.405, 92p., In French. Ph.D. thesis. Refs. p.90-92.

The stated purpose of this study was to determine the relationship between the rate of deformation and the stress deviator in ice with rotational orthotropic symmetry. The plastic behavior of an isotropic monocrystal is compared to that of a polycrystal. A method is described which permits to establish the power of the 3rd invariant of the stress deviator. The experimental setup is described and the mathematical derivations are given.

F-36425
Le Gac, H., **Study of regularities governing the behavior of polycrystalline ice (inelasticity and plasticity)** [Contribution à la détermination des lois de comportement de la glace polycristalline (anélasticité et plasticité)], *France. Centre national de la recherche scientifique. Laboratoire de glaciologie et géophysique de l'environnement. Publication,* 1980 No.293, 136p., In French. Ph.D. thesis. Refs. p.131-136.

An experimental study is reported dealing with the effects of crystal size, fabric and temperature on the speed of secondary deformation of artificial and natural polycrystalline ice. A model is presented accounting for the deformation of transitory ice flow based on the evolution of internal macroscopic stresses. The quantitative forecasts are compared with experimental data from torsion and torsion-compression flow tests. Computer programs are included.

F-36443
Romanov, A.A., Studitskiĭ, V.A., **Ice-information automation system for research vessels in the southern ocean based on the SM-4 computer** [Avtomatizirovannaia ledovo-informatsionnaia sistema dlia nauchno-operativnogo obespecheniia sudokhodstva v IUzhnom okeane (na baze EVM SM-4)], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.186-199, In Russian. 9 refs.

The principles of a system handling ice data, developed for the SM-4 computer, are discussed. The data, such as the location of drifting ice and the edge of fast ice, and of ice of different compaction, are also used in the compilation of maps of the ice regime in the southern ocean for 1956-1981.

F-36448
Allison, I., **Understanding ice dynamics,** *Australian natural history,* Summer 1986-87 22(3), p.110-111.

A brief sketch is given of the massive ice cover over the land and sea areas of the antarctic region. The winter cover nearly doubles the size of the Continent as 20 million sq km of sea ice encapsulate the land mass. The impact of the ice is noted and methods of extracting data from it are mentioned.

F-36449
Hamley, T., **Floating giants,** *Australian natural history,* Summer 1986-87 22(3), p.112-115.

Birth of icebergs calving from the ice shelves and glaciers of Antarctica is briefly recounted along with historical perceptions of and experiences with icebergs as objects of terror, disaster, and enchantment. Distribution, erosion, melting, rollovers, and eventual reduction to drops of freshwater mixing with sea water are described.

F-36464
Jacobs, S., Barnett, D., **On the draughts of some large antarctic icebergs,** *Iceberg research,* June 1987 No.14, p.3-13, 27 refs.

A preliminary outline of two major events, the calving of Larsen Ice Shelf and that of Filchner Ice Shelf that occurred in 1986, is presented. Satellite images taken before and after the events, and tracks of the larger underway icebergs relative to the sea floor topography are shown. Past large-iceberg trajectories and some problems related to iceberg sizing are also noted.

F-36465
Amos, A.F., **Shipboard observations of a giant iceberg near Clarence Island, South Shetlands,** *Iceberg research,* June 1987 No.14, p.14-17.

This is a preliminary report on observations made of a giant iceberg from R/V *Polar Duke* on Jan. 9, 10, 11, 1987 near Clarence I. A description of the berg and the circumstances of its location as recorded in shipboard notes is presented. Figures show the cruise track of R/V *Polar Duke* in the vicinity of the big berg and the location of the iceberg from four separate sightings. (Auth. mod.)

F-36477
Berliant, A.M., Serapinas, B.B., Suetova, I.A., **New cartometric determinations of antarctic ice volume** [Novye kartometricheskie opredeleniia ob"ema l'da Antarktidy], *Moscow. Universitet. Vestnik. Seriia 5 Geografiia,* Jan.-Feb. 1987 No.1, p.34-40, In Russian. 11 refs.

Various methods used in measuring the antarctic ice sheet volume for compilation of maps are evaluated. Pertinent literature is reviewed, and figures and tables are presented for the following: mean values of ice sheet volume, for the continent alone and with the inclusion of ice shelves; ice volume determination, with the assistance of hypsographic curves of the ice sheet, the bedrock area above and below sea level, and of the ice shelves. Fragments of maps showing ice surface features, subglacial topography, and ice thickness are included.

F-36478

Daley, C., St. John, J.W., Brown, R., Glen, I., **Consolidation of local ice impact pressures measured aboard USCGC *Polar Sea* (1982-1984),** *Transport Canada. Report,* Sep. 1986 TP 8533E, 50p. + appends., With French summary. 42 refs.

This report presents a consolidation of local pressure measurements made over a 3 year period, on the USCGC *Polar Sea,* in both Arctic and Antarctic waters. A panel in the bow of the vessel contains instrumentation capable of recording ice pressures during an impact. During the 3 years, 3680 ice impact events have been recorded. The report presents an analysis of the forces and pressures measured and makes recommendations for iceworthy ship design criteria. Five appendices contain detailed information on the data, statistical analysis and design criteria. Ice pressures depend mainly on ice severity and not on ship mass or velocity. The pressure/area effect appears to be influenced by strain rate. Extreme pressures tend to follow a Frechet (Type II) distribution for the most severe forms of ice. Further collection of ice loads is appropriate, due to the statistical nature of the phenomena. Investigation of the plastic behavior of icebreaker scantlings is recommended.

F-36498

Barry, R.G., **Snow and ice indicators of possible climatic effects of increasing atmospheric carbon dioxide,** Workshop on First Detection of Carbon Dioxide Effects, Harpers Ferry, WV, June 8-10, 1981. Proceedings. Carbon dioxide effects research and assessment program. Edited by N.B. Beatty, Washington, D.C., U.S. Dept. of Energy, Office of Energy Research, 1981, p.207-236, DOE/CONF-8106214; DE82-016 633, Refs. p.231-236.

Studies of the general problem of possible snow and ice responses to carbon dioxide-induced warming are reviewed; the components of the cryosphere are summarized. Types of CO2 effects on the cryosphere are discussed, and characteristics of snow and ice parameters and factors involved in their variability are shown in a table. On the basis of present knowledge, it is suggested that a CO2-induced warming on the century time scale will have only minor consequences for ice sheets and ground ice or permafrost. Changes in sea ice concentrations, however, may be anticipated on the 10- to 50-year time scale; a possible decreasing trend in antarctic sea ice extent warrants careful monitoring. Recommendations to this effect are included.

F-36499

Etkins, R., Epstein, E.S., **Rise of global mean sea level as an indication of climatic change,** Workshop on First Detection of Carbon Dioxide Effects, Harpers Ferry, WV, June 8-10, 1981. Proceedings. Carbon dioxide effects research and assessment program. Edited by N.B. Beatty, Washington, D.C., U.S. Dept. of Energy, Office of Energy Research, 1981, p.343-359, DOE/CONF-8106214; DE82-016 633, 20 refs.

Rising mean sea level, it is proposed, is a significant indication of global climate change. Calculations indicate that thermal expansion alone cannot explain the observed rise in sea level over the last 40 years; significant discharges of polar ice must be occurring. During the past 40 years more than 50,000 cubic kilometers of ice have been discharged and have melted, reducing the surface warming that might ohterwise have occurred by as much as a factor of two. The transfer of mass from the polar regions to a thin spherical shell covering all the oceans should have increased the earth's moment of inertia and correspondingly reduced the speed of rotation by about 1.5 parts in 100 million. This accounts for about three quarters of the observed fractional reduction in the earth's angular velocity since 1940. Monitoring of global mean sea level, ocean-surface temperatures, and the earth's speed of rotation should be complemented by monitoring of the polar ice sheets such as is now possible by satellite altimetry. (Auth. mod.)

F-36504

Lal, D., **10-Be in polar ice: data reflect changes in cosmic ray flux or polar meteorology,** *Geophysical research letters,* Aug. 1987 14(8), p.785-788, 27 refs.

Expected changes in the global cosmic ray production of Be-10 in the atmosphere are related to changes in solar activity, and consequent variations in its fallout in the polar regions. The global Be-10 production rate is about 20% higher during periods of very low solar activity, compared to the average solar modulation level observed during the past 3 solar cycles. The stratospheric Be-10 fallout pattern was derived using the fallout data for Sr-90 as an analog. This fallout shows an amplitude attenuation by a factor of about three at 70 deg; the higher the latitude, the higher the attenuation. The results have been compared with the long time series available for Be-10 in polar ice in Greenland and in Antarctica, 70-78 deg latitude. It is concluded that the observed variations in Be-10 concentrations in ice cores are primarily due to climatic changes, for both short and long period variations. Thus Be-10 data can be used as a proxy for climate induced meteorological changes in the polar region. (Auth.)

F-36505

Cragin, J.H., Giovinetto, M.B., Gow, A.J., **Baseline acidity of precipitation at the South Pole during the last two millennia,** *Geophysical research letters,* MP 2275, Aug. 1987 14(8), p.789-792, 38 refs.

Measurements of meltwater pH from annual layers of South Pole firn and ice samples ranging in age from 40 to 2000 years B.P. show that precipitation at this remote site has a higher natural acidity than that expected from atmospheric equilibrium with CO2. The average pH of deaerated (CO2-free) samples was 5.64, while air-equilibrated samples averaged 5.37, a pH that is about a factor of two more acidic than the expected background pH of 5.65. The observed "excess" acidity can be accounted for by sulphur and nitrogen cation levels in the samples originating from non-anthropogenic H2SO4 and HNO3. Because of the presence of these naturally occurring acids in South Pole precipitation, a pH of 5.4 is considered a more representative baseline reference pH for acid precipitation studies. (Auth.)

F-36511

Parkinson, C.L., Good, M.R., **Sensitivity of a climatologically-driven sea ice model to the ocean flux,** *U.S. National Aeronautics and Space Administration. Technical memorandum,* Jan. 1982 NASA TM 83877, 29p., N82-17799, 8 refs.

A set of ocean-heat-flux sensitivity studies has been performed on a numerical model of sea ice covering the Weddell Sea The model is driven by mean-monthly climatological atmospheric variables; it contains an 8-hour timestep and a 200-km horizontal resolution; and the simulations proceed from Jan. of year 1 through Feb. of year 2. For each model run, the ocean heat flux is uniform in both space and time. In a series of 6 model runs, this flux magnitude has been varied from 0 to 40 W/sq m, with the result that, in these climatologically-driven simulations, a value of 25 W/sq m yields the most realistic sea ice distributions. Ocean heat fluxes below 20 W/sq m do not provide sufficient energy to allow the ice to melt to its summertime thicknesses and concentrations by the end of the 14-month simulation, whereas ocean heat fluxes of 30 W/sq m and above result in too much ice melt, producing the almost total disappearance of ice in the Weddell Sea by the end of the 14 months. These results, however, are strongly dependent on the atmospheric forcing fields. (Auth.)

F-36515
Ventajas, L., **Occlusion of polynucleate hydrocarbons in ice** [Oclusión de hidrocarburos polinucleados por los hielos], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.334, 9p., In Spanish with English, French and German summaries. 4 refs.

Studies of the occlusion and adsorption of polynucleate hydrocarbons in ice are considered. Determinations of spectrofluorometry have been carried out in antarctic sea ice and in frozen sea water to which small quantities of crude petroleum were added. Tabulated data obtained at Marambio and Belgrano II stations are presented. (Auth. mod.)

F-36549
Wilson, C.J.L., **Deformation induced recrystallization of ice: the application of *in situ* experiments,** *American Geophysical Union. Geophysical monograph,* 1986 No.36, Mineral and rock deformation: laboratory studies, edited by B.E. Hobbs and H.C. Heard, p.213-232, 72 refs.
DLC TA706.5.M55 1986

Evidence for nucleation in natural and experimentally deformed polycrystalline aggregates of ice is discussed, and the observation of dynamic recrystallization during *in situ* experiments is described. Deformation in the temperature range above -5 C produces marked adjustments along pre-existing grain boundaries, slip and grain rotation on (0001), deformation band and kink band formation, new grain nucleation and boundary migration. The dominant nucleation mechanism and accompanying changes in grain shape and size involve dynamic recrystallization by rotation of subgrains and/or bulging of new high angle or pre-existing boundaries, through a process of migration recrystallization. There is little evidence for a distinct intercrystalline nucleation mechanism, even though many of the intracrystalline nuclei are dominantly on the margins of the host grain. Thin sections from Law Dome Samples are used in the discussions on deformation mechanisms and recrystallization nuclei of natural ice. (Auth. mod.)

F-36572
Hughes, T.J., **Marine ice transgression hypothesis,** *Geografiska annaler. Series A Physical geography,* 1987 69A(2), p.237-250, 29 refs.

The sequence of transitions from sea ice to fast ice to ice shelves to marine ice domes to an ice sheet is examined, with special attention to how marine ice transgression may have produced the Laurentide Ice Sheet. Figures comparing the glaciation of North America, Eurasia, and Antarctica according to high-land origin, windward growth, the instantaneous glacierization, and the marine ice transgression hypotheses for forming ice sheets are shown and discussed. (Auth. mod.)

F-36587
Johnston, A.C., **Suppression of earthquakes by large continental ice sheets,** *Nature,* Dec. 3, 1987 330(6147), p.467-469, 32 refs.

The interior regions of Antarctica and Greenland are aseismic: no earthquake larger than body-wave magnitude 4.5-5.0 is known for either, except along coastal zones or continental shelves. An explanation is advanced for this lack of seismic activity in terms of pressure effects produced by the continental ice sheets that mantle both continents. (Auth.)

F-36588
Saigne, C., Legrand, M., **Measurements of methanesulphonic acid in antarctic ice,** *Nature,* Nov. 19, 1987 330(5145), p.240-242, 19 refs.

Dimethylsulphide (DMS), mainly produced by marine biogenic activity, plays an important role in the atmospheric sulphur budget. Methanesulphonic acid (MSA) and sulphur dioxide (SO2, hereafter converted into non-sea-salt (n.s.s.) sulphate) are the main oxidation products of DMS. As opposed to n.s.s. sulphate, which has other sources (for example, volcanoes, terrestrial sulphate), MSA represents an unequivocal indicator of marine biogenic activity. MSA has previously been investigated in marine aerosols at low and mid-latitudes as well as in precipitations and polar ice; here are presented 54 MSA measurements made in antarctic ice. Coastal area precipitations exhibit unexpectedly high (up to 100%) MSA/n.s.s. weight ratios *(r)* compared with values commonly observed in mid-latitude marine atmospheres. At higher elevations (2,000 m) the *r* values suggest a marine biogenic input of more global significance. The MSA concentrations (several p.p.b.) confirm that the n.s.s. sulphate in antarctic ice is mainly derived from marine biogenic activity. During the last ice age, MSA contents were 2-5 times higher than today. This study of high-latitude precipitations demonstrates the feasibility of reconstructing past marine biogenic activity of global significance. (Auth.)

F-36589
Buckley, R.G., Trodahl, H.J., Langhorne, P.J., **Scattering and absorption of visible light in sea ice from transmission and backscattering measurements,** *New Zealand. Department of Scientific and Industrial Research. Physics and Engineering Laboratory. Report,* July 1986 No.951, 40p., 25 refs.

A new experimental technique, developed and tested in McMurdo Sound, Antarctica for the *in situ* measurement of the diffusive transport of light through sea ice, is described. A weakly divergent monochromatic light source is placed on the surface of the ice and the emergent radiation field is measured at both the top and bottom surfaces. The magnitudes of the emergent radiance and their dependence on distance from the source have given the first simple and direct measurement of the light scattering length, inhomogeneity and anisotropy in this very complex material. The scattering length is 0.06 m and isotropic near the top but changing in the bulk to about 0.1 m for horizontal paths and 0.2 m for vertical paths. It has also been possible to separate out the effects of a strongly scattering top surface layer and of an absorbing layer near the ice-water interface that we have associated with algae. (Auth.)

F-36603
Gonda, T., Sei, T., **Evaporation form of ice crystals in subsaturated air and their evaporation mechanism,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.113-121, 14 refs.

The evaporation form and the evaporation mechanism of dendritic ice crystals grown in air of 100,000 Pa and at water saturation and polyhedral ice crystals grown in air of 40 Pa and at relatively low supersaturation are studied. In the case of dendritic ice crystals, the evaporation preferentially occurs in the convex parts of the crystal surfaces and in minute secondary branches. On the other hand, in the case of polyhedral ice crystals, the evaporation preferentially occurs in the parts where screw dislocations or stacking faults emerge. On the basis of these experimental results, the formation mechanism of single bullets observed at Mizuho Station is inferred. (Auth.)

F-36604
Fujita, S., Nakawo, M., Mae, S., **Orientation of the 700-m Mizuho core and its strain history,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.122-131, 10 refs.

Structural analyses of the core revealed that the ice fabric pattern as well as the shape of individual ice grains and air bubbles exhibited strong anisotropies. They were correlated with the stress conditions of the ice sheet around the station. This became possible by an estimation of the geographical orientation of the core through measurements of the natural remanent magnetization formed accidentally. It was found that ice grains and air bubbles were elongated in the direction of flow, which was identical with the direction of the tensile strain. Also, *c*-axes of the ice grains tended to orient perpendicular to the tensile axis, forming a vertical great girdle pattern, which is considered to have resulted from the gradual rotation of the ice grains toward a plane normal to the tensile axis. The rotation of the grains was calculated with respect to the total strain, simulating a formation of the great girdle fabric pattern. By comparing the simulated fabric pattern with the measured pattern of the Mizuho core, the accumulated strain in the core ice was estimated at various depths. The total strain the core ice has experienced increased almost linearly with depth at a rate of about 20% per 100 m. (Auth.)

F-36605

Kanamori, S., **Preliminary report on the contamination control for chemical analyses of antarctic ice samples,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.132-139, 2 refs.

A possible penetration of contamination from the surface toward the inner part of cored ice and firn block samples was investigated for proper chemical analysis of Cl, SO4, NO3, NH4, Na, K, Mg, Al, Fe, Ni, Cu, Zn and other elements. Generally, the contamination of the ice core sample remains within 10 mm under the surface. However, for the elements with intense contamination, a high concentration level in the surface layer tends to affect the level in the inner part. For the firn block sample, though the contamination by Cl, SO4 and NO3 remains within 20 mm of depth from the surface, NH4, Na, K, Cu and Zn seem to pass through the surface layer but remain within 40 mm. A thermal knife was constructed, for use in the laboratory, of nichrome wire of 1 mm diameter covered with a platinum pipe, tested for cutting cored ice samples and was found satisfactory without significant contamination of the elements listed above. The use of a stainless steel hand saw was also found practical for firn block samples. (Auth.)

F-36606

Saki, H., Funaki, M., **Acquisition of natural remanent magnetization in snow and ice containing rock dust,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.140-145, 3 refs.

Paleomagnetic study of the dirt-ice collected in the Allan Hills showed stable remanent magnetization in the dirt-ice. Experiments were performed to make clear the magnetization mechanisms of the dirt-snow and dirt-ice. Two types of artificial samples were prepared for this purpose. One was dirt-ice frozen from wet snow and the other was dry snow containing rock dust. The former samples acquired the stable remanent magnetization parallel to the geomagnetic field. This natural remanent magnetization (NRM) was acquired immediately during the freezing process from wet snow. The latter samples, preserved under low temperature conditions of both -10 and -20 C, acquired gradually the NRM in the direction of the geomagnetic field. The NRM's moment in the latter samples was not saturated during the 22-day preservation in low temperature condition. The acquisition of NRM advanced more effectively at -10 than -20 C. (Auth.)

F-36607

Souchez, R., Tison, J.L., Jouzel, J., **Freezing rate determination by the isotopic composition of the ice,** *Geophysical research letters,* June 1987 14(6), p.599-602, 9 refs.

The distribution of an isotopic species, HDO (deuterium) or H2O-18 (oxygen), in ice formed by the migration of a well-defined freezing front in water is dependent on the freezing rate. Development of a box diffusion model combined with the boundary layer concept leads to a possibility of prediction of the freezing rate in nature by the determination of the isotopic composition of the ice in *delta*D or *delta*O-18. The isotopic distribution in ice formed during experiments conducted with variable freezing rates gives results in accordance with the model. Investigation on lake ice formed under well-known climatic conditions provides a further test of the model. Ice used in this study was taken from cores drilled at Roi Beaudouin and Plateau Stations. (Auth.)

F-36614

Lemke, P., **Coupled one-dimensional sea ice-ocean model,** *Journal of geophysical research,* Nov. 15, 1987 92(C12), p.13,164-13,172, 26 refs.

A prognostic one-dimensional mixed layer-pycnocline model describing the vertical structure of the upper ocean is coupled to a thermodynamic sea ice model. The coupled prognostic model is compared with the more usual sea ice model overlying a fixed mixed layer with constant oceanic heat flux and is then applied to investigate the effect of temporal and regional variations of the entrained oceanic heat flux on the sea ice cover in both polar regions. In the southern ocean a standard simulation is compared with two perturbation experiments which both describe the occurrence of a polynya. In the Arctic Ocean the effect of possible Soviet river diversions is investigated. Finally, the response of the coupled model to paleoclimatic forcing and boundary conditions is presented. (Auth.)

F-36626

Raĭkovskiĭ, IU.V., **Heat- and mass-exchange at the lower surface of the Ross Ice Shelf** [Teplo- i massoobmen u nizhneĭ poverkhnosti shel'fovogo lednika Rossa], *Materialy gliatsiologicheskikh issledovaniĭ,* Jan. 1987 Vol.59, p.42-48, In Russian with English summary. 22 refs.

Theoretical examination of heat and mass exchange at the lower surface of the Ross Ice Shelf associated with sea water circulation in subglacial sea due to the tidal pump, has been made. Conditions generating the zone of melting as well as the zone of ice freezing at the lower surface of the ice shelf are shown. The melting-freezing process has been estimated from the developed theoretical model. The computations allows to distinguish the zones of intensive melting (from 100 to 50 cm/a at a distance of several km from the ice front); medium intensity melting (from 50 to 10 cm/a at a distance of 100 km from the ice front); feeble melting (from 10 to 0 cm/a); feeble freezing (from 0 to 5 cm/a). The melting zone has a wedge-like form intruding into the central part of the Ross Ice Shelf. (Auth.)

F-36627

Vtiurin, B.I., **Lacustrine ice in the Schirmacher and Unter-See ponds in Antarctica** [Ozernye l'dy v oazisakh Shirmakhera i Unter-zee v Antarktide], *Materialy gliatsiologicheskikh issledovaniĭ,* Jan. 1987 Vol.59, p.169-173, 9 refs., In Russian with English summary.

A great variety of lacustrine ice reflecting the differences in its origin and environmental conditions has been observed in the antarctic oases of Schirmacher and Unter-See, and their environments. The main causes of differences in the structure of lake ice are: its

location, dimensions, the depth of lakes, wind regime, etc. The lake ice of the oases (intra-oasis, periglacial, epishelf) and of superglacial lakes occurring on the surface of ice sheets and on the Lazarev Ice Shelf, is investigated. The informative capacity of the structure of lake ice, revealing the nature of antarctic oasis and of the abutting areas is discussed. (Auth.)

F-36671

Cahalan, R.F., Chiu, L.S., **Large-scale short-period sea ice atmosphere interaction,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.141-144, 22 refs.

The purpose of this paper is to show that synoptic-scale ice fluctuations occur in the region of the sea ice margin, and that their wavenumbers and advection speeds suggest a rapid response to synoptic-scale forcing by the atmosphere. High-frequency synoptic-scale sea ice fluctuations are significant not only because they provide direct evidence of the link with atmospheric variations occurring on the same space and time scales, but also because they represent the primary background of "climatic noise" from which any true "climatic signal" must be extracted. In the next section the available data is described. Section 3 describes a difference filter that isolates the high frequency variations, and focuses on one case study of possible sea ice-atmosphere interaction. Section 4 summarizes major results, discusses the climatological significance of such sea ice fluctuations, and suggests possible future work in sea ice modeling. (Auth.)

F-36719

Nishio, F., **Volcanic activities recorded in the antarctic ice sheet,** *Polar news,* Aug. 1986 No.43, p.2-9, In Japanese.

Deep ice cores from the polar regions of Antarctica and Greenland contain extensive records of paleoclimate and paleoatmospheric composition in the form of soluble and insoluble impurities, stable isotope variations and gases trapped in air bubbles in the ice. Especially, many tephra layers were observed in the ice cores recovered from Byrd Station and examined whether the volcanism recorded in the Byrd core affected the paleoclimate and atmospheric chemistry during the last glacial period. In the Northern Hemisphere during the past 10,000 years, large volcanic eruptions were revealed by acidity profiles along well dated Greenland ice cores, and comparison with a temperature index shows that clustered eruptions have a considerable cooling effect on climate. Recently many dirt layers of tephra were found on the bare ice surface in the Meteorite Ice Field near the Yamato Mountains, Dronning Maud Land, and near the Allan Hills, Victoria Land, Antarctica. The Yamato ash has been derived from a volcano of the South Sandwich Islands, which are about 3000 km away from the Yamato Mountains. The Allan ash may have been supplied from some young volcano of the McMurdo Volcanic Group. These studies of tephra layer in the bare ice area provide useful information on paleoclimate and mechanism of meteorite concentration.

F-36721

Ageta, Y., **From the Antarctic Inland Dome to Asuka Camp,** *Polar news,* Aug. 1986 No.43, p.28-44, In Japanese.

The 26th Japanese Antarctic Research Expedition (JARE) 1984-1986 extended the field work of the East Queen Maud Land Glaciological Project, which was initiated by JARE-23. The major activities of JARE-26 involved oversnow traverses toward the inland plateau and Sör Rondane Mountains, and ice core drillings of 200 m, 40 m and 100 m in depth at the Advance Camp (74 12'S, 34 59'E), the Dome Camp (77 00'S, 35 00'E) and S25 (69 02'S, 40 28'E), respectively. The main traverse of JARE-26 was planned to make observations around a dome-like plateau (Valkyrjedomen), where the second highest dome of the antarctic ice sheet is situated. The highest area of that plateau was named 'Dome Fuji' by the party, unofficially. At the end of the first summer of the wintering in Feb. 1985, a base house was constructed at the Advance Camp. A traverse toward the dome was carried out during the second summer of the wintering in Nov. and Dec. 1985, and the highest place of this dome was found at 77 22'S, 39 37'E with an altitude of 3,807 m by the use of the doppler satellite positioning system. After the above traverse, the routes from the Advance Camp to Asuka Camp at the north Sör Rondane Mountains were connected.

F-36759

Sharma, S.S., **Study of Dakshin Gangotri ice-shelf,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.243-248, 2 refs.

The ice shelf on which the Indian station Dakshin Gangotri is located forms part of an unnamed ice-shelf. Snow studies pertaining to this ice-shelf, carried out during 1983-'85 and the studies carried out in the past are described in this paper. During the period of study, the central part of this ice-shelf, where Dakshin Gangotri is located, experienced severe blizzards and a substantial amount of snow accumulation. The net snow accumulation in this region is 70 to 80 cm/year. This part of the ice shelf is fairly stable and has a negligible flow rate. Measurements on ice thickness, carried out in the past, indicate the average thickness in the region of the station is about 390 m. (Auth.)

F-36773

Alley, R.B., **Firn densification by grain-boundary sliding: a first model,** *Journal de physique,* Mar. 1987 48(3), p.C1-249-C1-256, 21 refs.

Densification in highly porous, isothermal firn occurs primarily by Newtonian sliding on grain boundaries, but the coordination number increases with density and restricts further sliding. At a relative density of about 0.6 the coordination number approaches 6 and sliding ceases to be a primary mechanism of densification; the resulting decrease in densification rate causes the critical point in depth-density profiles. A simple model for densification by boundary sliding yields a good fit to observed profiles. The viscosities so obtained give an activation energy equal to that for grain-boundary diffusion. (Auth.)

F-36794

Robin, G. de Q., Drewry, D.J., Squire, V.A., **Satellite observations of polar ice fields,** *Royal Society of London. Philosophical transactions. Ser A,* 1983 309(1508), p.447-461, Also published in: Study of the ocean and the land surface from satellites. Proceedings of a Royal Society discussion meeting held on 10 and 11 November 1982. Organized and edited by J.T. Houghton, A.H. Cook and H. Charnock, p.205-219. 42 refs.

DLC GC10.4.R4S78 1983

This paper outlines the reasearch needed to advance the knowledge of polar ice masses that could be or has been provided by satellite techniques. Inland ice sheets, ice shelves and pack ice on polar oceans are discussed in separate sections. Because a satellite radar altimeter can cover wide areas of polar ice economically and rapidly, the interpretation of altimeter results is discussed in detail. Theoretical considerations are used to explain various characteristics of pulse shapes recorded over Antarctica by Seasat. Over inland ice, surface undulations cause the pulse shape to change rapidly with location, and the leading edge to migrate rapidly. Altimetry over ice shelves should be accurate to better than about 1 m and provide new methods for studying their mass balance. Nearly all sea ice returns that have been studied show a characteristic glistening quite distinct from returns from the open ocean, inland ice or ice shelves. (Auth. mod.)

F-36797
Broecker, W.S., Peng, T.H., **Role of CaCO3 compensation in the glacial to interglacial atmospheric CO2 change,** *Global biogeochemical cycles,* Mar. 1987 1(1), p.15-29, 17 refs.

The only viable explanations put forth to date for the glacial to interglacial change in atmospheric CO2 content suggested from measurements of the CO2 content of gas extracted from ice cores involve changes in the ocean's nutrient cycles. Evidence from deep sea sediments suggests that these changes are compensated on the time scale of a few thousand years by reductions or increases in amount of CaCO3 accumulating in deep sea sediments. This compensation process has two important consequences. First, it significantly increases the magnitude of the CO2 change per unit of nutrient forcing. Second, it causes a delay in the response of the atmospheric CO2 change. While the first of these consequences is a boon to those seeking to explain the CO2 change, the second may prove to be a curse. The ice core CO2 record shows no evidence of a significant lag between the CO2 response and the polar warming. (Auth. mod.)

F-36825
Schlatter, R., **Iceberg sightings during the Chilean SIBEX-Phase II cruise in the Bransfield Strait, Antarctica, 1985,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.65-69, 5 refs.

For Spanish version and abstract see F-35274 or 42-2812.

F-36873
Lee, S.M., Haas, W.M., **Development of methodology for design of snow roads and airstrips,** Houghton, Michigan Technological University, 1986, 37p.

With the object of developing methods for improved runways in Antarctica, rammsonde profile measurements were made at selected sites of the roadways between McMurdo Station and Williams Airfield and at several points in the Amundsen-Scott Station skiway, taxiway and construction sites. Snow pit data were collected at various locations at both stations. This report summarizes the following: the present status of the snow pit data analysis; a study aimed at developing a suitable binder-snow mix and a method to process snow for higher compaction strength; and the current status of a field test in Houghton to try several binder-snow mix *in situ.* It is concluded that several layers of snow-binder mixture compacted, one layer at a time, on heat-treated base of hard ice will likely accommodate safe traffic and wheeled landing of aircraft during the austral summer at South Pole Station and in McMurdo.

F-36906
Chinn, T.J.H., **Victoria Lower Glacier and Ross Sea glaciation, Dry Valleys area, South Victoria Land, Antarctica,** *Journal of glaciology,* 1987 33(115), p.293-299, 22 refs.

Victoria Lower Glacier is a complex structure of ice from two distinct sources (Schultz Glacier to the north and a local *névé* of Victoria Lower Glacier) that join at a broad median shear zone. Evidence from the margins suggests that both are currently retreating. Algae in a block of frozen stratified sediment from within the ice of the terminal margin has a radiocarbon age of 20,200 year BP (NZ 6531 A), indicating that the glacier has advanced since that time. Superposition of ice levels of Ross Sea I glaciation on a radio echo-sounding profile of bedrock beneath the glacier indicates that it is unlikely that Ross Sea I ice entered the valley. The radiocarbon date supports this finding. (Auth.)

F-36907
Chinn, T.J.H., Dillon, A., **Observations on a debris-covered polar glacier "Whisky Glacier", James Ross Island, Antarctic Peninsula, Antarctica,** *Journal of glaciology,* 1987 33(115), p.300-310, Refs. p.309-310.

"Whisky Glacier" on James Ross I., comprises a *névé* and clean ice trunk surrounded by an extensive area of debris-covered ice resembling a rock glacier. The debris-free trunk of the glacier abuts abruptly against the broad, totally debris-covered tongue at a number of concentric zones where debris-laden beds crop out at the surface in a manner similar to the "inner moraine" formations of many polar glaciers. Ice structures and foliation suggest that "Whisky Glacier" is a polythermal glacier which is wet-based under the debris-free zone, and dry-based under the debris-covered zone. The transition from wet-based to dry-based conditions at the glacier sole is a powerful mechanism for entraining debris into a glacier and, in the case of "Whisky Glacier", for lifting debris to the surface. It is suggested that this may be a mechanism for forming some polar rock glaciers. (Auth. mod.)

F-36908
Sugden, D.E., **Stable isotopes and debris in basal glacier ice, South Georgia, southern ocean,** *Journal of glaciology,* 1987 33(115), p.324-329, 9 refs.

This paper combines a study of the rock debris and deltaD/deltaO-18 isotopic characteristics of basal ice sequences in 3 representative glaciers in South Georgia and concludes that the debris and ice has been entrained mainly by basal freezing. The size distribution of the rock debris is typical of crushing and abrasion, and reflects transport at the ice-rock interface. The deltaD/deltaO-18 relationships show that clear ice associated with the debris has accreted through freezing. The white bubbly glacier ice has deltaD/deltaO-18 relationships typical of precipitation which demonstrates an altitudinal effect between glaciers. (Auth.)

F-36909
Lindstrom, D.R., MacAyeal, D.R., **Environmental constraints on West Antarctic ice-sheet formation,** *Journal of glaciology,* 1987 33(115), p.346-356, 20 refs.

The importance of sea-level, accumulation rate, and ice influx from the East Antarctic ice sheet in the re-establishment of the West Antarctic ice sheet from a thin cover is investigated using a time-dependent numerical ice-shelf model. Results show that a precursor to the West Antarctic ice sheet can form within 3000 years. Sea-level lowering caused by ice-sheet development in the Northern Hemisphere has the greatest environmental influence. Under favorable conditions, ice grounding occurs over all parts of the West Antarctic ice sheet except up-stream of Thwaites Glacier and in the Ross Sea region. (Auth. mod.)

F-36910
Aristarain, A.J., Pinglot, J.F., Pourchet, M., **Accumulation and temperature measurements on the James Ross Island ice cap, Antarctic Peninsula, Antarctica,** *Journal of glaciology,* 1987 33(115), p.357-362, 19 refs.

Basic glaciological measurements from the James Ross I. ice cap are presented, including mean annual accumulation and firn temperature. In addition to the well-known radioactivity levels of Jan. 1955 and 1965 in antarctic snow, two new radioactivity levels corresponding to Jan. 1969 and Jan. 1974 are used in determining the accumulation values. The measurements reveal certain climatic features of this ice cap. (Auth.)

F-36911
Ling, C.H., Rasmussen, L.A., Benson, C.S., **Stress-strain relation for dry snow in Greenland and Antarctica,** *Journal of glaciology,* 1987 33(115), p.369-373, 16 refs.

A stress-strain relation for dry snow in Greenland and Antarctica was derived. When this relation is integrated, it gives snow density as a function of time. For given surface density, temperature, and accumulation, the age of snow layers can be obtained as a function of depth in the snow-pack. Calculations compare well with observations. With some knowledge of the temperature range in the upper layer of the snow-pack, calculation for density versus depth can also be improved over the results where such temperature information was not used. (Auth.)

F-36935
Pozdeev, V.S., Kurinin, R.G., **New data on ice sheet morphology, bedrock and bottom relief in the southern Weddell Sea basin, West Antarctica** [Novye dannye o morfologii ledovoĭ tolshchi i rel'efe podlednogo lozha i morskogo dna v iuzhnoĭ chasti basseĭna moria Ueddella (Zapadnaia Antarktida)], *Antarktika; doklady komissii,* 1987 No.26, p.66-71, In Russian. 8 refs.

Maps of the ice cover and bottom topography of Weddell Sea, the ice cover thickness of Filchner and Ronne ice shelves and adjacent mountains and glaciers, are discussed. A relationship between height and depth of the ice shelf, and length of time of seismic and electromagnetic wave transmission through the ice, is established. The possible causes of different morphological and structural forms of the bedrock topography are considered. Evidence is found for brine infiltration into the inner layers of the ice shelves, which distorts the true values of their vertical dimensions.

F-36938
Blinov, K.V., Dmitriev, D.N., **Ice rheology parameters from long term borehole studies at Vostok Station** [Otsenka reologicheskikh parametrov l'da po rezul'tatam mnogoletnikh nabliudeniĭ v skvazhinakh na st. Vostok v Antarktide], *Antarktika; doklady komissii,* 1987 No.26, p.95-106, In Russian. 15 refs.

Ice creep curves, plotted from borehole wall deformation data obtained for the period 1974-1984, are analyzed. Basic rheological parameters of the flow law of ice are calculated for the area investigated, and it is shown that it is possible to use them to predict stress-induced ice deformations around boreholes.

F-36939
Chistiakov, V.K., Chugunov, V.A., Zemtsov, A.A., **Investigation of cavity formation in the ice sheet for liquid or gas sampling** [Issledovanie protsessa formirovaniia kaverny v ledovom massive dlia otbora proby zhidkosti ili gaza], *Antarktika; doklady komissii,* 1987 No.26, p.107-112, In Russian. 2 refs.

As part of a study of the dynamics of cavity melting in the ice sheet, to increase the effectiveness of liquid or gas sampling, an approximate mathematical model is discussed, and illustrated, of the process of heat and mass transfer in the circulation of a liquid convective heating agent. Theoretical and experimental results are shown to be in good agreement.

F-36940
Suetova, I.A., **Average height, volume and thickness of antarctic ice (new data)** [Sredniaia vysota, ob"em i moshchnost' l'da Antarktidy (novye dannye)], *Antarktika; doklady komissii,* 1987 No.26, p.113-119, In Russian. 11 refs.

Based on cartographic information obtained in the last 20 years, the following morphometric data on Antarctica are tabulated and discussed: the average height of ice and rock surface, the ice volume and average thickness, and the amplitude of glacio-eustatic variations. The methods of measurement are described, and their accuracy is evaluated.

F-36941
Vtiurin, B.I., Hermichen, W.D., Kowski, P., **Ice sheet composition and structure in the Schirmacher Ponds area** [Sostav i stroenie materikovogo l'da v raĭone oazisa Shirmakhera (Antarktida)], *Antarktika; doklady komissii,* 1987 No.26, p.120-129, In Russian. 27 refs.

Study of isotope composition and structure of the ice sheet and shelf ice of Schirmacher Ponds shows that the basal layers of ice 10 or more meters thick consist of fossil ice thicker than the contemporary, post-Pleistocene ice cover of Queen Maud Land. The upper portion of the ice sheet north of the Wohlthat Mountains and the upper 150 m of Lazarev Ice Shelf were formed by regional accretion of post-Pleistocene precipitation.

F-36942
Krass, M.S., **Thermomechanics of icebergs** [Termomekhanika aĭsbergov], *Antarktika; doklady komissii,* 1987 No.26, p.130-147, In Russian. 32 refs.

A review of thermal and physical properties of icebergs shows that the meltwater under a freely floating iceberg can have a heat screening effect. The ablation of surface ice of a towed iceberg, especially in view of underwater melting, significantly decreases the strength of the ice. Under conditions of prolonged towing, the deterioration and final destruction of the iceberg are found to be unavoidable. Thus, to consider icebergs as a potential source of fresh water over long distances is found to be entirely impractical.

F-36959
Wadhams, P., Lange, M.A., Ackley, S.F., **Ice thickness distribution across the Atlantic sector of the Antarctic Ocean in midwinter,** *Journal of geophysical research,* MP 2314, Dec. 15, 1987 92(C13), p.14,535-14,552, 9 refs.

The entire width of the antarctic sea ice zone was traversed in the vicinity of 0 deg longitude from July 18 to Sep. 10, 1986. Ice thicknesses were measured by direct drilling, by helicopter profiling using an Exstar 100-MHz impulse radar system and by aerial photography. The results of the point measurements (drilling) are reported in this paper together with an indication of how the radar and photography data will be used to extend them so as to yield area-averaged ice thickness distributions. The main ice type across the entire width of the ice cover was consolidated pancake ice occurring in vast floes; this formed out of a 250-km-wide band at the advancing ice edge which comprised a concentrated field of individual pancakes in a matrix of frazil ice. Preferred thicknesses of undeformed floes were 40-60 cm of ice covered with 5-15 cm of snow. The individual pancakes attained almost all of this thickness before consolidation; subsequent congelation growth was slow, estimated at 0.4 cm/d. The floes contained much small-scale roughness on the upper and lower surfaces due to rafting of pancakes at the time of consolidation, but pressure ridging was modest except in the far south. A few very thick (8-11 m) multiyear floes were observed embedded in the pack at latitudes beyond 66S. (Auth.)

F-36966
Gow, A.J., Ackley, S.F., Buck, K.R., Golden, K.M., **Physical and structural characteristics of Weddell Sea pack ice,** *U.S. Army Cold Regions Research and Engineering Laboratory,* CR 87-14, Aug. 1987 70p., ADA-188 189, 31 refs.

During Feb. and Mar. 1980 the physical properties of Weddell Sea pack ice were investigated via core drilling of 66 floes located along a transect of 600 nautical miles from 64 S to 74 S latitude at roughly 40 W longitude. These studies revealed widespread frazil ice in amounts not known to exist in arctic sea ice of comparable age and thickness. It is estimated from structure studies of 62 of the 66 floes that 54% of the total ice production in the Weddell Sea is generated as frazil. The disposition and exceptional thicknesses of the frazil show that mechanisms other than surface turbulence effects are involved and imply that the circulation and structure of water in the upper levels of the Weddell Sea are significantly different from those in the Arctic basin. Salinities of both first-year and multi-year floes are notably higher than those of their Arctic counterparts because summer surface melting is rare or absent in the Weddell Sea; in the Arctic, downward percolating meltwater flushes through the ice and lowers its salinity. Fluorescence was evaluated as a means of revealing biological activity in Weddell Sea pack ice. It proved useful as an index of combined living and dead material in the ice, but measurements failed to establish any consistent relationship between fluorescence and salinity as suggested by earlier work in the Weddell Sea. (Auth.)

F-36967

Robin, G. de Q., Swithinbank, C., **Fifty years of progress in understanding ice sheets,** *Journal of glaciology,* 1987 Special issue, p.33-47, Refs. p.44-47.

Both the form and extent of the surface features of ice sheets have been defined more clearly by the relatively recent use of satellite studies (imagery and altimetry). In an analogous way, radio echo-sounding has enabled the accurate calculation of ice thicknesses and the mapping of the sub-ice bedrock contours, and hence estimation of the ice volume. Studies on the dynamics of ice sheets have been enhanced by bore-hole sampling of deep ice and the determination of ice-temperature distributions, coupled with measurements of mass balance and both surface and internal ice movement. Internal deformation of ice sheets, surging, and various flow theories are considered in relation to recent modelling studies. Global geophysics inevitably includes the role of ice sheets, and therefore climatological studies and new atmospheric chemistry data, together with information on the distribution of meteorites on the antarctic ice sheet, are considered critically. Modern concepts of the evolution of ice sheets have substantially modified earlier ideas of the glacial geologists and have explained much that had previously mystified them. (Auth.)

F-36968

Zwally, H.J., **Technology in the advancement of glaciology,** *Journal of glaciology,* 1987 Special issue, p.66-77, 97 refs.

Many of the major advances in glaciology during the past 50 years have followed the development and application of new technology for viewing and measuring various characteristics of ice. Microscopes to study ice crystals, radars to probe the internal structure of large ice masses, mass spectrometers to analyze the atomic composition of ice cores, and satellite sensors to measure the global distribution of ice are some of the tools readily adapted by glaciologists. Today, new tools include microcomputers for automatic data logging, large-memory computers for data processing and numerical modeling, sensitive instruments for ice analysis, and satellite sensors for large-scale ice observations. In the future, continued advances in key technologies will help guide the evolution of science questions considered by glaciologists, expanding the view of ice, its fundamental properties, its interactions within the ice-ocean-land-atmosphere system, and its role in the evolution of the global environment. Use of the changing technology in Antarctica is described in text and photos. (Auth.)

F-36977

Hempel, G., **Antarctic marine research in winter: the Winter Weddell Sea Project 1986,** *Polar record,* Jan. 1988 24(148), p.43-48, 5 refs.

Between June 27 and Dec. 1986 the West German research ship RV *Polarstern* completed Winter Weddell Sea Project, the first detailed winter survey of the pack ice, oceanology and biota of the offshore and eastern coastal Weddell Sea south to 76 deg S. This article briefly describes the ship and outlines the scientific program, which involved 137 scientists and technicians from 12 German and 16 non-German institutions. In the cruise of June 27-Sep. 17 research was centered on physical and chemical investigations of the structure and dynamics of water, ice and lower atmosphere, including growth and movement of the icefield. The ship penetrated almost to the coast of Dronning Maud Land, failing, however, to find the Weddell Polynya which had appeared on satellite imagery in 1976-78. The cruise of Sep. 28-Dec. 14 added biological investigations to the program; crossing the main body of pack ice to investigate the eastern coastal polynya, the biology of sea ice, plankton, fish and bottom fauna, and the breeding and feeding of seals and penguins were investigated. Use was made of a field station established on the mainland ice cliff. Helicopters extended the range of the work on both cruises. (Auth.)

F-36978

Eicken, H., Grenfell, T.C., Stonehouse, B., **Sea ice conditions during an early spring voyage in the eastern Weddell Sea, Antarctica,** *Polar record,* Jan. 1988 24(148), p.49-54.

During a late winter and early spring oceanographic voyage south into the Weddell Sea the icebreaker RV *Polarstern* first encountered patches and bands of loose floes at 58S; these increased over the next 150 km to form closed ice pack which extended 1000 km to the coast. Along the coast the ship encountered almost continuous shore leads and polynyas that formed repeatedly despite persistently low air and sea temperatures. These areas of open water form under the action of strong offshore winds that carry the main body of pack ice west and southwest. Polynyas and leads narrow and disappear temporarily only when winds with northerly or westerly components bring the pack ice toward the land, and reform as soon as offshore winds predominate. Open water, often more than 15 km wide, was present close to the ship throughout the spring voyage, facilitating oceanographic work as far south as 77S. *Polarstern's* full icebreaking capacity was needed only occasionally when winds temporarily pressed the pack ice against the coast. The presence throughout early spring of both fast and pack ice, separated by a zone of thin ice or open water, is essential to large populations of Weddell seals, emperor penguins and whales in the area. (Auth. mod.)

F-36986

Barry, R.G., **Cryosphere—neglected component of the climate system,** Toward understanding climate change. The J.O. Fletcher lectures on problems and prospects of climate analysis and forecasting, edited by U. Radok, Boulder, Westview Press, 1987, p.35-67, Refs. p.62-67.

DLC QC981.8.C5T65

What is known about the extent and variability of the cryosphere, particularly looking at land snowcover and sea ice, is summarized. Recent modelling studies on ice/albedo climate feedback and its magnitude relative to other feedbacks are reviewed, and some of the observational evidence for such feedback processes on synoptic to monthly time scales is considered. The cloud problem, which is one of the complicating factors in studying high-latitude snow and ice, is discussed and some aspects of predictability are reviewed. (Auth. mod.)

F-37005

Mulvaney, R., Wolff, E.W., Oates, K., **Sulphuric acid at grain boundaries in antarctic ice,** *Nature,* Jan. 21, 1988 331(6153), p.247-249, 14 refs.

It has been suggested that acids in the cold polar ice sheets may exist as aqueous mixtures at grain boundaries. This assumption can

correctly predict the d.c. conductivty pf polar ice, but this does not prove the existence of acids or liquid veins at grain boundaries, and this remains controversial. In this study a scanning electron microscope (SEM) was used, equipped with a cold stage and an energy-dispersive X-ray microanalysis facility, to determine the location of sulphur in ice from the Antarctic Peninsula. As expected, sulphur was undetectable in the bulk of the ice. However, at the junctions where three grains met (triple-junctions), sulphur was found in concentrations greater than 1 M in areas of <1 sq micrometer. Calculations show that between 40 and 100% of the sulphuric acid present in this ice was found at the triple-junctions, and would have been liquid at ice-sheet temperatures. This finding, if general, has considerable implications for many of the physical properties of polar ice. (Auth.)

F-37006

Dubov, A.A., Irishin, V.S., **Ramming methods of ice breaking in Antarctica** [O rabote sudov nabegami vo l'dakh Antarktiki], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1985 Vol.391, p.51-54, In Russian.

The use of cargo ships in antarctic ice and the advantages of the ramming technique of icebreaking are discussed. Testing has proved that the mean velocity of icebreaker movement increases when two icebreakers work simultaneously on parallel courses, using the ramming technique.

F-37017

Hindmarsh, R.C.A., Morland, L.W., Boulton, G.S., Hutter, K., **Unsteady plane flow of ice-sheets: a parabolic problem with two moving boundaries,** *Geophysical and astrophysical fluid dynamics,* 1987 39(3), p.183-225, 31 refs. 3 appends.

Finite difference algorithms have been developed to solve a one-dimensional non-linear parabolic equation with one or two moving boundaries and to analyze the unsteady plane flow of ice-sheets. They are designed to investigate the response of an ice-sheet to changes in climate, and to reconstruct climatic changes implied by past ice-sheet variations inferred from glacial geological data. Two algorithms are presented and compared. Both agree with the limited solutions available, and agree between themselves on the test runs carried out for the case where no analytic solutions are available. (Auth. mod.)

F-37027

Trepov, G.V., Pozniak, V.I., **Measuring the velocity of vertical electromagnetic wave propagation in the antarctic snow cover, in the frequency ranges 3, 7 and 10 GHz** [Izmerenie skorosti vertikal'nogo rasprostraneniia elektromagnitnykh voln diapazonov 3, 7 i 10 GGTs v antarkticheskom snezhnom pokrove], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1985 Vol.395, p.24-35, In Russian. 4 refs.

Field measurements of vertical radiowave propagation velocities were made at five points, at distances of 44 to 376 km from sea shores. The least squares method was used supplemented with experimental relationships of the time interval between pulses reflected by snow surface and by a metallic reflector (a steel plate) buried in snow. Experimental relations and the calculation results are presented.

F-37064

Kornilov, N.A., Leont'ev, E.B., Fedotov, V.I., **Ice conditions, state of the ice cover and fast ice characteristics in Alasheyev Bight** [Ledovye usloviia, sostoianie ledianogo pokrova i nekotorye kharakteristiki pripaĭnogo l'da v zalive Alasheeva], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.18-28, In Russian. 4 refs.

Results of studies of ice conditions in Alasheyev Bight from Dec. 1974 to Feb. 1976 are presented. Tabulated data includes the following: water temperature, under the ice and at different distances from the shore, for Jan.-Mar. 1975; thickness of one-year-old and 2-years-old fast ice in the coastal zone; ice cover and snow cover thickness for Aug. 21-23, 1975; and monthly salinity values of one-year-old fast ice from Nov. 1975 to Feb. 1976. Illustrations of seasonal stratigraphy and strength of one-year-old ice show it to be at its weakest in the last 10 days of Jan. and the first 10 days of Feb. It is recommended that expedition ships navigate along the western coast of the Tange Promontory and the southern coast of the bay.

F-37066

Nazintsev, IU.L., Fedotov, V.I., **Influence of liquid phase on strain-strength energy of sea ice** [O vliianii zhidkoĭ fazy na prochnost' i energiiu deformatsii antarkticheskogo morskogo l'da], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.35-42, In Russian. 10 refs.

Data on the structure, composition, salinity, temperature and models of ice elasticity, from studies carried out on the research vessel *Mikhail Somov* in 1978-1981, as well as from studies at Molodezhnaya Station in 1971-1976, are examined, and a distinct relation between ice strength and structure, particularly in relation to the liquid phase component, is found.

F-37067

Vol, A.A., Ionov, B.P., Lednev, V.A., **Snow-ice adhesion to ship's hull** [O mekhanizme oblipaniia korpusa sudna], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.42-45, In Russian. 3 refs.

Results of investigations on the effect of snow and ice adhesion on ships' speed, carried out on the *Mikhail Somov* during the 26th and 27th Soviet Antarctic Expedition, are presented. Basic conditions to induce adhesion include: unfavorable air temperature, the presence of ground and finely fractured ice, speed of ship less than 10-12 knots, the presence of snow on the ice surface, significant corrosion of the hull, and absence of protective hull cover. It is also found that adhesion takes place unevenly over different areas of the hull, and that hydrometeorological and geographical conditions do not correlate with the severity and frequency of the adhesion, although its occurrence is more probable in sea water than in fresh water.

F-37069

Diurgerov, M.B., Korolev, P.A., Manevskiĭ, L.N., Pukhov, V.A., **Study of long period average accumulation of atmospheric precipitation in the Mirnyy Station area** [Issledovaniia srednemnogoletneĭ akkumuliatsii atmosfernykh osadkov v raĭone observatorii Mirnyĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.51-57, In Russian. 4 refs.

Results of studies of firn-ice cores from 2 boreholes, carried out in the vicinity of Mirnyy Station during the 26th Soviet Antarctic Expedition in July-Aug. 1981, are discussed. Tables are presented showing respective location and characteristics of the boreholes (47.5 and 50.0 m above sea level, 16.38 and 31.16 m depth, and -8.9 and -8.3 C temperature); 1955-1981 spring-summer net accumulation data; and snow and firn structure.

F-37079
Simonov, I.M., **Unusual moraine** [Neobychnaia morena], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.109-111, In Russian.

After a brief description of the location, geography, morphology, dimensions, ice cover features and water characteristics of Lake Unter-See, a moraine found by the 28th and 29th Soviet Antarctic Expeditions in Dec. 1983, located in the southwestern corner of the lake, next to the Anuchin Glacier, is described. The moraine consists of rocks 2-3 m in diameter, unlike those found elsewhere in the lake, and is approximately 300-500 m wide. Discussion centers on the possible processes contributing to the formation of the moraine.

F-37097
Tazawa, Y., Fujii, Y., **New types of spherules from Antarctica: meteoritic impact origin?,** *Geophysical research letters,* Dec. 1987 14(12), p.1199-1202, 20 refs.

Spherules collected from antarctic ice have been studied by using instrumental neutron activation analysis, energy dispersive X-ray spectrometry and X-ray diffraction photography. Peculiar spherules, Ca-Ti-rich (perovskite) type (CTS) and Fe-Cr-Ni-rich type (FCN), were found in the Mizuho ice core at depths of 32 to 33.5 m. Both types have rare earth element (REE) abundances. In the Allan Hills bare ice, only a "chondritic" type without depletion of Au and S (CAS) was recognized. Size distributions and influx rates of spherules for these ices and the Mizuho surface snow indicate that antarctic spherules are composed of steady-falling and occasional populations. All the results combine to suggest that CTS and FCN may be droplets strewn by the impact of a huge meteorite, and CAS must be debris from one of the chondrites that fell on the source region of the Allan Hills bare ice and survived terrestrial alterations. (Auth. mod.)

F-37118
Simmons, D.A., Lurcock, P.M., **Movement of Halley, derived from SATNAV measurements 1986-1987,** *British Antarctic Survey. Bulletin,* Feb. 1988 78, p.55-57, 3 refs.

Recent estimates of the velocity of the Brunt Ice Shelf have been based on fixing the position of the BAS station Halley, on shipborne observation of the ice front, and on comparison of features seen on Landsat images taken some 12 years apart. In Jan. 1986 a simple satellite navigation (satnav) receiver was installed at Halley and since then has been used to give regular 'position fixes'. These indicate that the velocity of 740 m per annum found for the period 1972-1982 has been maintained in the period Jan. 1986 to July 1987. (Auth.)

F-37149
Blinov, K.V., Vostretsov, R.N., Dmitriev, D.N., **Temperature distribution in the antarctic ice cover along the profile Mirnyy Observatory-Vostok Station** [Raspredelenie temperatury v tolshche lednivovogo pokrova Antarktidy po profiliu observatoriia Mirnyĭ-stantsiia Vostok], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* May 1987 No.60, p.159-163, In Russian with English summary. 3 refs.

Borehole measurements of ice temperature along the Mirnyy-Vostok profile revealed a distinct regularity, best expressed in marginal parts of the ice sheet, which governs variations of temperature gradient with depth in different regions. Interconnections among the temperature gradient distribution, physical properties of snow-firn deposits and global climatic changes are discussed.

F-37150
Mitiaev, P.V., **Gas hydrates in the ice of glacial covers** [Gazovye gidraty vo l'du lednikovykh pokrovov], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* May 1987 No.60, p.163-165, In Russian with English summary. 8 refs.

The presence of air in the form of gas hydrates at great depths of the antarctic ice was sustained theoretically and experimentally. Regarding gas formation as a phase transformation of ice into crystalline lattice composed of water molecules and stabilized by the molecules of adsorbed gas, the thermodynamic Hibbs potential is evaluated according to given mathematical formulas and its changes are discussed, with the conclusion, that gas hydrates might be present in ice sheets at temperatures and pressures existing at depths of 1100-1200 m. Short discussions on thermographic studies of ice cores are presented as an experimental proof of the existence of gas hydrates in ice, and the paleontologic significance of the results obtained (ice dating) is stressed.

F-37154
Radok, U., Lingle, C.S., **Surging as a potential response of ice sheets to CO2-induced changes in the polar environment. Progress report, Sep. 1985-Aug. 1986,** *U.S. Department of Energy. Report,* Aug. 1986 DOE/ER/60197-9, 23p., Refs. p.10-12.

The past year has brought the project within sight of its twin objectives—an assessment of the current potential for antarctic surges that would affect sea level, and the development of improved models for simulating the ice sheet behavior in response to CO2-induced warming. Revised plans for the conclusion of the project, during the remainder of 1986 and a 5 month no-cost extension, have been made both necessary by personnel changes and desirable for the full exploitation of results. Abstracts of ice sheet modelling studies carried out by W.F. Budd, B.J. McInnes, D. Jenssen and I.N. Smith, with the conclusion that the effects for sea level change could be substantial but manageable, are appended. (Auth. mod.)

F-37177
Barry, R.G., **Melting of polar ice caps,** *Weather,* Feb. 1988 43(2), p.60-61, 3 refs.

More data are added to an earlier response to F.E. Lumb's concern for a global rise in sea level due to glacier melting and thermal expansion of the ocean. Based on a 1985 report of the Polar Research Board, the possibility is suggested that by AD 2100 the sea could rise by 0.1-0.3 m from each of two causes: the collapse of the West Antarctic ice sheet because it is insecurely grounded, and wastage of small glaciers produced by global warming.

F-37214
Adams, R.D., **Antarctic earthquakes,** *Nature,* Feb. 25, 1988 331(6158), p.665, 4 refs. For the item being critiqued see 42-1144 (F-36587).

A critique is made of a prior report which could have been interpreted to mean that no earthquakes had occurred in interior Antarctica. Occurrences of such earthquakes are pointed out showing their locations, the antarctic stations which recorded the events, and the search methods used to locate the events.

F-37215
Neftel, A., Oeschger, H., Staffelbach, T., Stauffer, B., **CO2 record in the Byrd ice core 50,000-5,000 years BP,** *Nature,* Feb. 18, 1988 331(6157), p.609-611, 21 refs.

Analysis of air in polar ice cores revealed 30% lower CO2 values during glacial periods than during interglacial periods. At present this is confirmed by results from six different ice cores, two from Greenland and four from Antarctica. In all cores the CO2 change

coincides with the change in the isotopic composition of the ice, expressed as either the *delta*O-18 or *delta*D ratio; both are indicators for the mean annual surface temperature. A great number of samples have been studied from the deep ice core from Byrd Station, drilled in 1968. These measurements allow the reconstruction of the atmospheric CO2 concentration in the specified time period in great detail. (Auth.)

F-37219

Faure, G., **Extreme O-18 depletion in calcite and chert clasts from the Elephant Moraine on the east antarctic ice sheet,** *Nature,* Mar. 24, 1988 332(6162), p.352-354, 19 refs.

Two large moraines are presently forming near the margin of the east antarctic ice sheet west of Victoria Land where the flow of the ice sheet is disturbed by subglacial bedrock ridges of the Transantarctic Mountains. During the 1983-84 search for meteorites in this area several clasts, composed of black acicular calcite crystals, were collected from the Elephant Moraine (76.3S; and 157.3E) where they are ablating out of the ice. Additional samples of this calcite were later collected from the Elephant Moraine during the 1984-85 and 1986-87 field seasons, but none was found at the Reckling Moraine at 76.2S and 158.7E. The calcite clasts are strongly depleted in O-18 and in C-13 in addition to being enriched in radiogenic SR-87 relative to sea water. These results suggest that the calcite precipitated from aqueous solutions discharged by hotsprings under the east antarctic ice sheet. (Auth. mod.)

F-37245

Li, J., Xie, Z., Huang, M., **Fabrics of the ice cores from BHQ on Law Dome ice cap, Antarctica,** *Kexue Tongbao,* Feb. 1988 33(3), p.216-220, 4 refs.

Investigation of antarctic glaciers by Chinese researchers began in 1982 at Law Dome ice cap in the north of Wilkes Land, East Antarctica. In the ablation zone along the margin of the ice cap, melting takes place in summer, where the mean air temperature in Jan. is above 0 C; no melting can be seen in the recrystallization zone at Dome Summit. In 1983, several ice cores from the 430 m depth level on Law Dome were sent to China for analysis in detail. In this article, their microstructure and ice crystal orientation fabric are discussed. The core is divided into three layers, as follows: the deposition layer (upper 160 m), where the changes are mainly in the shape and size of ice crystals; the transition layer (160-300 m), where the fabric pattern variation is unstable; and the deep layer (below 300 m), with the greatest crystal size fluctuation. (Auth. mod.)

F-37250

Alley, R.B., **Fabrics in polar ice sheets: development and prediction,** *Science,* Apr. 22, 1988 240(4851), p.493-495, 31 refs.

Fabrics in polar ice sheets provide a record of deformational history and control the viscosity of ice during further deformation; they affect geophysical sensing of ice sheets and provide an accessible analogue to fabric development during deformation of other geological and engineering materials. A new synthesis of experimental and theoretical results shows that *c*-axis fabrics are quantitatively related to cumulative strain and stress state in ice sheets for the full range of likely flow patterns. Basal shear, divergent flow, and parallel flow cause *c* axes to rotate toward the vertical axis, whereas convergent flow causes *c* axes to rotate toward a vertical plane transverse to flow. (Auth.)

F-37270

Verbitskiĭ, M.IA., **Numerical experiments on the hydrothermodynamics of the East Antarctic and Greenland ice sheets,** Data of glaciological studies: chronicle discussions. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1988, p.73-86, TT 81-52175, 21 refs.

A three-dimensional thermodynamic model of a large stationary ice sheet is analyzed by the simultaneous solution of the heat-transfer and glacier dynamics equations. Atmospheric precipitation, surface temperature, and geothermal flux are preassigned in the computations. Surface topography of the ice sheets, their volume, temperature, and velocity distribution over a number of glaciers are calculated. The results of computations made for the present East Antarctic and Greenland ice sheets are in good agreement with the empirical data. Reported are the results of the computations of some parameters of the East Antarctic Ice Sheet during its maximum spreading at the end of the Miocene and for the last glacial maximum. Computations reveal that climatic warming, which may occur in future under the influence of human activity, will not bring about significant changes in the volume of the East Antarctic Ice Sheet, provided air temperatures increase by no more than 10-12 C. With less warming, its volume may even grow due to the increase of atmospheric precipitation. Under conditions of greater warming ice sheet disintegration may begin. The temperature increase crucial for Greenland is 7 C.

F-37271

Zagorodnov, V.S., **Direct measurements of the position of the lower surface of the Ross Ice Shelf, Antarctica,** Data of glaciological studies: chronicle discussions. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1988, p.248-251, TT 81-52175, 1 ref.

In Dec. 1978, glaciologists of the Institute of Geography, USSR Academy of Sciences working on the Ross Ice Shelf Project, installed ultrasonic sensors and quartz thermometers under the ice shelf in the J-9 camp. This equipment is intended to measure ice freezing and temperature at the lower surface of the ice shelf. Measurements repeated after 11 months showed that 60 mm of ice had frozen at the lower surface of the ice shelf, while the ice temperature 2 m from the lower surface was -2.26 C. Also presented are the scheme and description of the ultrasonic sensor installed in the borehole.

F-37272

Dreĭer, N.N., Kotliakov, V.M., **Collection of materials in England and Norway for the World Atlas of Snow and Ice Resources,** Data of glaciological studies: chronicle discussions. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1988, p.373-374. TT 81-52175.

The authors, one of whom is editor-in-chief of the forthcoming World Atlas of Snow and Ice Resources, visited several institutions in Norway and Britain. Their experiences, information received and documents acquired are described.

F-37273

Miagkov, S.M., **Discussion on the Ross Ice Cover in the Würm stage,** Data of glaciological studies: chronicle discussions. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1988, p.447-455, TT 81-52175, 19 refs. For original paper see 34-3147 or 11F-23276. For discussion by M.G. Grosval'd see 42-2709 or F-37269.

Geophysical, geomorphological, geochemical and paleontological data contradicting the Ross Ice Sheet hypothesis are analyzed. It is believed that the extension of the West Antarctic Ice Sheet in Würm did not reach further than the middle of the present Ross Ice Shelf, and that north polar exploration standards should be applied to Antarctica with allowance for the peculiarities of antarctic climate.

F-37313
Zakharov, V.F., **Sea ice and climate** [Morskie l'dy i klimat], Vzaimodeĭstvie oledeneniia s atmosferoĭ i okeanom (Interactions between glaciation, atmosphere and ocean) edited by V.M. Kotliakov and M.G. Grosval'd, Moscow, Nauka, 1987, p.66-89, In Russian.

Formation of sea ice in both hemispheres is discussed. The antarctic glacial situation compared to the Arctic Ocean and physical causes of sea ice impact on climatic conditions, resulting in major changes, are argued and illustrated with meteorological, oceanographic and glaciological data.

F-37323
Stauffer, B., Lochbronner, E., Oeschger, H., Schwander, J., **Methane concentration in the glacial atmosphere was only half that of the preindustrial Holocene,** *Nature,* Apr. 28, 1988 332(6167), p.812-814, 15 refs.

Air entrapped in bubbles of cold ice has essentially the same composition as that of the atmosphere at the time of bubble formation. Measurements on ice core samples from Byrd Station (Antarctica) and Dye 3 (Greenland) show that the atmospheric methane concentration was only about 350 parts per billion by volume (p.p.b.v.) during the last glaciation, compared with a mean preindustrial level of about 650 p.p.b.v. and a present value of 1,650 p.p.b.v. (Auth.)

F-37326
Wadhams, P., **Winter observations of iceberg frequencies and sizes in the South Atlantic Ocean,** *Journal of geophysical research,* Apr. 15, 1988 93(C4), p.3583-3590, 19 refs.

The numbers and apparent sizes of icebergs in the South Atlantic Ocean in midwinter were measured by radar and visually from FS *Polarstern* during the 1986 Winter Weddell Sea Project cruise. Results show that in a heavy sea (sea state 7-8), icebergs have to be at least 115 m in diameter to be detected at all and that detectability falls off severely for all bergs at ranges exceeding 8 n. mi. (15 km); that most bergs had diameters of less than 1 km with a preferred size of 400-500 m; and that a high density of icebergs in the latitude band 53-56S at longitude 19-30W contrasted with a virtual absence of bergs in the same latitude band at longitude 1-9E. The latter effect is ascribed to melt and wave-induced deterioration causing the disappearance of this iceberg population between the two sets of longitudes. (Auth.)

F-37327
Crépon, M., Houssais, M.N., Saint Guily, B., **Drift of icebergs under wind action,** *Journal of geophysical research,* Apr. 15, 1988 93(C4), p.3608-3612, 17 refs.

The steady motion of an iceberg under wind action is studied in the presence of a mixed layer. Analytical solutions are obtained when the iceberg depth is less than or much larger than the mixed layer depth. A few numerical examples are given. The results show that winds of medium or low strength have a limited effect on the motion of deep icebergs extending below the thermocline. Furthermore, the larger the horizontal scale of the iceberg the smaller the wind drift. Hence for winds of less than 10 m/s the trajectory of deep icebergs more than 1 km long is shown to be representative of geostrophic currents. The effect of a possible "lift" force is also estimated. Equations developed in this study are based on data collected from antarctic icebergs. (Auth. mod.)

F-37328
Qin, D., **Densification process of snow/firn in the surface layer of the antarctic ice sheet,** *Journal of glaciology and geocryology,* 1987 9(3), p.193-205, 25 refs., In Chinese with English summary.

The densification process of snow/firn in the surface layer of the antarctic ice sheet is affected by the environment. The process also is a summation of the variations in both macroscopic and microcosmic processes, and has a rich feature of geographic zonality. This process is divided into three types (warm, cold and transformed) on the basis of the studies of shallow snow/firn cores in Wilkes Land, Antarctica, and the studies of predecessors. Data on distribution and mean annual temperature of these types are presented. These three types of densification process are characterized by different macroscopic and microcosmic features, such as the diagram of density versus depth, compactive viscosity coefficient, crystal size and crystal growth rate, C axis orientation and elongation of snow/firn crystal in the snow/-firn. (Auth. mod.)

F-37370
Nakada, M., Lambeck, K., **Melting history of the Late Pleistocene antarctic ice sheet,** *Nature,* May 5, 1988 333(6168), p.36-40, 34 refs.

Spatial and temporal variations in the sea levels of the past 20,000 years around the globe place constraints on the melting history of the major Late Pleistocene ice sheets. The antarctic ice sheets provided a significant contribution to the sea-level rise at a rate that was approximately synchronous with the melting of the Laurentide ice sheet, except for the interval 9,000-6,000 years ago, when it may have lagged behind. Minor melting of the antarctic ice sheet continued throughout the Holocene. (Auth.)

F-37417
Saltzman, B., Maasch, K.A., **Orbital forcing and the Vostok ice core,** *Nature,* May 12, 1988 333(6169), p.123-124, 13 refs. For the paper being commented on see 42-562 (F-36408).

The authors disagree with the statement in a recent paper that a non-linear response of ice sheets to orbital forcing is generally assumed to cause the 100-kyr oscillation which has dominated the climate record over the last million years. They then proceed to discuss other recent papers which tend to show that there is general agreement for orbital forcing as the primary factor in the 20-40kyr variations but not in the 100-kyr oscillation. Atmospheric CO2 is believed to be the critical variable in forming the basis for a natural nonlinear oscillator.

F-37420
Squire, V.A., Robinson, W.H., Langhorne, P.J., Haskell, T.G., **Vehicles and aircraft on floating ice,** *Nature,* May 12, 1988 333(6169), p.159-161, 16 refs.

Ice roads and ice runways are a common feature of Arctic and Antarctic transportation. Although theoretical work to calculate the deflection profile due to a moving load is well established, there has been little progress experimentally and early studies were subject to error because of the type of transducer used. Recently there has been a renewed interest in the problem which has led to several theoretical papers and to the collection of a small quantity of high-quality data. Reported here are some preliminary results from a new and complete set of experiments done on antarctic sea ice using strain gauges to measure directly the strain induced by the vehicle. The results show excellent agreement with theory in all respects. (Auth.)

F-37478
Grove, J.M., **Glacier fluctuations and hazards,** *Geographical journal,* Nov. 1987 153(3), p.351-369, Refs. p.366-367.

Physical readjustments involved in glacier fluctuations present high risk situations at certain times and places. An outline of the history of glacier fluctuations in Holocene times and particularly the Little Ice Age provides the context for a discussion of the types of

hazards associated with climatically led oscillations in populated areas and their timing. Any future change in climate towards the conditions obtaining in the Little Ice Age would now involve greater risk from hazard than existed in former centuries. A more probable change in climate is rising temperature caused by more carbon dioxide in the atmosphere resulting in rising sea levels and perhaps surging of the antarctic ice sheet. (Auth. mod.)

F-37479

Kamiyama, K., **Glaciological and chemical characteristics of snow in the inland plateau, east Queen Maud Land, Antarctica,** *Antarctic record,* Nov. 1987 31(3), p.163-170, 10 refs.

Glaciological observations on the high plateau in the eastern Queen Maud Land were carried out along the routes of oversnow traverses by the 25th and 26th JARE in 1984 and 1985. Surface topography of the dome-like plateau and the positions of ice divides were determined clearly. The dome is at 77.4S, 39.6E at an altitude of 3,807 m a.s.l. Snow drift samples were collected along the route from Mizuho Station to the dome and were melted carefully in a snow vehicle. The value of electric conductivity of the melted snow samples at 0 C was obtained before storing in the pre-cleaned bottles. In a home laboratory, pH measurements of the samples were carried out. High electric conductivity and low pH values were found among the snow samples collected in the dome area, especially around the region higher than 3600 m a.s.l. The region has different glaciological characteristics from those in the katabatic wind region: the lower degree of surface inclinations, the lower the net accumulation, the smoother the surface morphology, the lower ram hardness of the surface snow layer and the higher lapse rate of snow temperature at 10 m depth. Taking into consideration the comparatively higher concentration of artificial radio nuclides reported in other antarctic inland areas, the glacio-chemical environments in the antarctic inland region are thought to be characterized by the transport of stratospheric aerosols or gases. (Auth.)

F-37488

Nishimura, K., Maeno, N., **Discriminant function analysis applied to determining an initiation condition of drifting snow,** *Low temperature science (Teion kagaku). Series A Physical sciences,* 1987 No.46, p.111-117, 8 refs., In Japanese with English summary.

Discriminant functions were applied to determining the initial condition of drifting snow. The variables used in the analysis were air temperatures and wind speeds observed in Hokkaido and Antarctica. Critical conditions obtained from linear discriminant functions had an accuracy better than 74% for each observation. The threshold wind speed obtained from the data at Showa Station was almost constant (11 m/s) in the low temperature range and agreed well with the one at Mizuho Station; it may prove the validity of this method for determining the initiation condition objectively. A quadratic discriminant function sometimes led to so unreasonable results for the low temperature range that the accuracy was almost the same or somewhat less than the linear function. So far it was observed that the threshold wind speed decreases with lowering temperature above -10 C. But is was not possible to express this temperature dependence by both a linear and a quadratic discriminant function. The accuracies of discrimination obtained from both functions for the wide range of temperatures (-60 to about 0 C) and wind speeds (0 to about 30 m/s) were in the range of 70 to about 80%. (Auth.)

F-37494

Saigne, C., Kirchner, S., Legrand, M., **Ion-chromatographic measurements of ammonium, fluoride, acetate, formate and methanesulphonate ions at very low levels in antarctic ice,** *Analytica chimica acta,* 1987 Vol.203, p.11-21, 13 refs.

Ion chromatography is used to determine the concentrations of organic (formate, acetate and methanesulphonate) and inorganic (fluoride and ammonium) ions present in antarctic ice at less than a 100 millionth g/g levels. With suitable columns, the simultaneous measurement of these ions requires only 6 min. A sample volume of 5 ml is sufficient to reach the billionth g/g level. The determination of such low concentrations requires stringent contamination-free techniques. For formate and acetate, the samples should never come into contact with plastics. Except for methanesulphonate, all the ions studied can be produced by dissolution of the various gaseous compounds present in a polluted atmosphere. Therefore a glass device with pure nitrogen circulation was designed for air-free melting of samples. To prevent possible biological activity on organic matter, samples were analyzed immediately after melting. Measurements of ammonium ion in these antarctic ice samples demonstrate that the problem of contamination by surrounding ammonia was not completely eliminated in previous studies. The serious contamination problems encountered, particularly for carboxylic acids, cast doubt on some earlier results for remote areas. (Auth.)

F-37496

Neubauer, J., Heumann, K.G., **Nitrate trace determinations in snow and firn core samples of ice shelves at the Weddell Sea, Antarctica,** *Atmospheric environment,* 1988 22(3), p.537-545, 37 refs.

The definitive method of isotope dilution mass spectrometry was applied to determine nitrate traces in surface snow and firn core samples of different ice shelves along the Weddell Sea and in precipitation near the Antarctic Peninsula. Three of a total number of 7 depth profiles analyzed showed weak seasonal variations with a trend to nitrate concentration maxima in summer and minima in winter. The average nitrate concentration of the depth profiles down to 220 cm lay in the range of 38-93 ng/g which agrees with other ice shelf analyses. The highest levels in ice shelf depth profiles are in the same range as those analyzed at the South Pole. No marine influence has been found for the nitrate concentration in contrast to the situation for chloride. The mean nitrate concentrations in new snow, in old surface snow and in firn core samples were 176, 107, and 60 ng/g, respectively, indicating a substantial decrease with time. (Auth. mod.)

F-37497

Legrand, M.R., Lorius, C., Barkov, N.I., Petrov, V.N., **Vostok (Antarctica) ice core: atmospheric chemistry changes over the last climatic cycle (160,000 years),** *Atmospheric environment,* 1988 22(2), p.317-331, 50 refs.

A 2083 m deep ice core from Vostok Station has been used for a comprehensive study of all major ions originating from aerosols deposited over the last climatic cycle (160,000 a), as depicted from the isotopic composition of the ice. For the first time in deep ice core studies, a good balance between anions and cations is obtained throughout the profile. This allows the clear identification of marine salts (i.e. sea salt and Na2SO4), terrestrial salts (calcium and magnesium associated with nitrates and sulfates) and strong mineral acids. Concentration profiles confirm that both marine and terrestrial aerosol inputs were higher during cold climate conditions than during the Last Interglacial and the Holocene stages. High concentration peaks (up to 5 and 30 times the Holocene values of marine and terrestrial contents, respectively) are in particular observed during the very cold climate characterizing the end of the penultimate glacial age and the Last Glacial Maximum which terminated around 15 ka B.P. These peaks reflect strengthened sources and transport during full glacial conditions, linked to higher wind speeds, more extensive arid areas on the continents and the greater exposure of continental shelves. As opposed to marine and terrestrial inputs, acidic gas-derived impurity concentrations remain relatively stable over the whole climatic cycle. This would indicate the absence of a long-term relationship between volcanism and climate. (Auth. mod.)

See also:
A-35685 A-36550 B-34791 B-34828 B-34889 B-35356 B-35358
B-35359 B-35361 B-35363 B-35443 B-35444 B-35445 B-35456
B-35472 B-35524 B-35616 B-35618 B-35656 B-35657 B-35659
B-35664 B-35726 B-35730 B-35930 B-35984 B-36009 B-36118
B-36306 B-36319 B-36451 B-36689 B-36915 B-36956 B-37255
C-34769 C-35306 C-35632 C-35850 C-36068 C-36070 C-36077
C-36080 C-36184 C-36486 C-36810 C-37148 D-36984 E-34677
E-34728 E-34732 E-35080 E-35190 E-35191 E-35203 E-35211
E-35299 E-35468 E-35479 E-35766 E-35769 E-35898 E-36020
E-36046 E-36065 E-36094 E-36136 E-36270 E-36453 E-36506
E-36952 E-37068 E-37268 E-37501 E-37502 G-34678 G-34717
G-34999 G-35054 G-35397 G-35471 G-35595 G-36078
G-36419 G-36718 G-36809 G-36868 G-37178 G-37179
G-37180 G-37325 I-34672 I-34782 I-34836 I-34837 I-34857
I-34897 I-34914 I-35046 I-35199 I-35328 I-35396 I-35415
I-35447 I-35477 I-35536 I-35539 I-35578 I-35717 I-35814
I-35824 I-35826 I-35829 I-35899 I-35937 I-35939 I-35941
I-36012 I-36083 I-36189 I-36288 I-36496 I-36571 I-36573
I-36590 I-36624 I-36625 I-36658 I-36660 I-36661 I-36664
I-36667 I-36678 I-36723 I-36811 I-36896 I-36897 I-36950
I-36982 I-37074 I-37083 I-37103 I-37201 I-37285 I-37385
I-37422 I-37516 J-34713 J-34896 J-35254 J-35348 J-35349
J-35357 J-35394 J-35501 J-35700 J-35932 J-35933 J-36186
J-36514 J-37024 J-37309 J-37373 J-37423 J-37518 K-36586
L-34681 L-34877 L-35742 L-36069 L-36507 L-36508 L-36758
L-36879

G. LOGISTICS, EQUIPMENT & SUPPLIES

G-34678

Sharma, S.S., **Criteria for selection of site for construction of structures on a floating ice shelf in Antarctica—a case study,** International Offshore and Navigation Conference and Exhibition, Helsinki, Oct. 27-30, 1986. POLARTECH '86. [Proceedings], VTT Symposium 71, Espoo, Valtion teknillinen tutkimuskeskus, 1986, p.1093-1105, 5 refs.

The coastal regions of Antarctica where substantial deposits of oil and other minerals are reported, consist of a number of ice shelves. Such areas encounter severe weather conditions and flow of the ice shelf which severely affect the life of the structure/installations. The Indian Antarctic station Dakshin Gangotri located in East Antarctica at 70 degree S 12 degree 05' E lies on one of such ice shelves. The paper brings out the criteria which should be kept in mind while selecting the site of a structure on an ice shelf and brings out a case study for selection of site of Indian research station Dakshin Gangotri in Dec. 1983 of which the author was the leader of the first wintering party. (Auth.)

G-34700

Greet, P., **Future of Mawson Institute in doubt,** *Australian physicist,* Mar. 1986 23(2), p.36-37, 9 refs.

The viability of the Mawson Institute for Antarctic Research, a department of the University of Adelaide, is in serious jeopardy due to lack of funding. The wide ranging deleterious effects of this course on Australia's antarctic research program are pointed out. The program, almost exclusively in atmospheric physics, is reviewed both at the institute and in Antarctica. The situation is that the current director of the Institute will retire in 1990. If the University does not hire a replacement director, the Institute will be effectively closed.

G-34712

Ayukawa, M., Hirasawa, T., Makita, K., **On the Japanese unmanned automatic observatory in Antarctica and some results obtained at the observatory,** *Journal of geomagnetism and geoelectricity,* 1986 38(3), p.201-220, 12 refs.

In conjunction with the scientific program of the International Magnetospheric Study (IMS), an unmanned ground-based observatory was constructed about 150 km southeast of Showa Station. Electric power source was supplied from batteries charged with a wind generator and it was maintained satisfactorily for more than 4 years during the period from 1977 to 1980. Several kinds of instrumentations such as fluxgate, induction magnetometer and riometer, were installed for the study of polar region phenomena. On the basis of aurora and geomagnetic variations observed at Showa, Mizuho and unmanned station (A1), it is found that small scale auroral electrojet currents really corresponded to auroral luminous regions and are assumed to be line currents. (Auth.)

G-34717

Kozlovskiĭ, A.M., Sedov, O.K., **Unloading of a large tanker near Mirnyy Station** [Opyt organizatsii razgruzki krupnotonnazhnogo tankera v raĭone Mirnogo], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.78, p.116-119, In Russian.

Dimensions are given and maneuvers and fuel unloading operations are described of the ship *Mikhail Somov* and the tanker *BAM* in the Lena Passage, between Apr. 21 and 24, 1979. It is reported that the operations were successful in spite of the ice thickness ranging between 20 and 40 cm and a 25 m/h wind. At 150 m off the coast, the ice thickness decreased to 10 cm.

G-34721

U.S. National Science Foundation. Division of Polar Programs, **Investigators guide to Palmer Station,** Washington, Aug. 1985, 24p.

This booklet is intended to assist participants in the U.S. Antarctic Research Program traveling to Palmer Station. It provides: travel information, such as health examination requirements, air tickets, baggage allowance; a list of clothing and personal items; description of research and living facilities and other helpful hints. A map of Palmer Station is included.

G-34722

U.S. National Science Foundation. Division of Polar Programs, **Your stay at McMurdo Station, Antarctica,** Washington, Aug. 1985, 16p.

This booklet answers questions most frequently raised by participants in the U.S. Antarctic Research Program upon their arrival at McMurdo. It describes the station's science facilities, lodging, general services, aircraft operations and vehicle use; it provides information about food and drink, fuels, community participation and other helpful hints. A map of the premises is included.

G-34723

U.S. National Science Foundation. Division of Polar Programs, **Your stay at Amundsen-Scott South Pole Station,** Washington, Aug. 1985, 10p.

This booklet is to assist participants in the U.S. Antarctic Research Program staying at Amundsen-Scott Station. It briefly covers facilities, procedures, services, and safety hints that will be of help at the South Pole. A site plan to the station is included.

G-34724

U.S. National Science Foundation. Division of Polar Programs, **Helicopter operations and safety guide,** Washington, June 1986, 20p.

This booklet, in a form suitable for pocket or pack, is intended to improve coordination between the user and the operator of aircraft, and to better prepare the user to take maximum advantage of his allotted flying time. Three appendixes include information regarding helicopter passenger clothing and survival gear, transportation by helicopter of hazardous cargo, and the Helo drop-off-passenger rules, respectively.

G-34748

Nadtochiĭ, G.L., **Geography of marine navigation** [Geografiia morskogo sudokhodstva], Moscow, Transport, 1985, 263p., In Russian with abridged English table of contents enclosed. 24 refs.

In part 1 of this book general problems of navigation conditions, route selection, ship operation and economics of marine transportation are discussed. Part 2 deals with Soviet sea transport in various oceans and seas, including the Arctic and Antarctic, parts 3-5 with sea routes of the socialist and capitalist countries, and international sea routes, respectively. Sea routes and navigation conditions in antarc-

tic seas are discussed on p.251-252. Risks to navigation in antarctic seas, such as inadequate mapping of location of some islands and ice shelves, severe weather conditions, drifting ice and icebergs, the whiteout phenomenon, frequent fog, etc., are described. Procedures followed by Soviet fishing and whaling fleets in route selection and navigation are explained.

G-34772
Shibuya, K., Kitazawa, Y., **NNSS translocation test in the Kanto District with special applications to antarctic research program,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.23-36, 20 refs.

Simultaneous receiving of NNSS satellites was made at the three stations, Tsukuba, Dodaira and Tokyo during 19-26 May 1984 and performance of translocation was tested with changed combination of reference points. Details of the methods and degree of accuracy in determining Cartesian coordinates of reference points are described. The translocation test involves estimating the radial offset between the translocation solution point and the standard point. Since one of the great difficulties in antarctic research is imprecision in identifying locations of geophysical investigations, the application of the system to Antarctica is emphasized. The operational difficulty in antarctic field research programs may be lightened because staying time at one receiving site will be reduced to under 24 h by applying the translocation technique. (Auth. mod.)

G-34894
Christ, R.F., **Three research flight missions in the eternal ice of Antarctica,** *Dornier post (English edition),* 1986 p.15-17.

This brief account tells of the performance of a new generation of Dornier aircraft, the 128 and 228 series, during the German Antarctic Expedition since 1983. Both aircraft are highly regarded for their reliability and versatility operating in the demanding and unforgiving antarctic environment. The contributions of the aircraft and crews to the success of the expeditions are rated as outstanding.

G-34950
Fresco-Mayoux, A., **Soviet research station disappears** [Une station de recherche soviétique disparue], *Science et vie,* Nov. 1986 No.830, p.61-63, In French.

The disappearance of the Soviet antarctic station Druzhnaya from the shelf ice over the Weddell Sea in October 1986 is reported. A short review of the establishment and cost of Druzhnaya is given and economic considerations for siting the station on the Filchner Ice Shelf are discussed and shown on a sketch map. Since the precise cause for the disappearance is unknown, certain speculative causes are proffered.

G-34996
Baker, M.J., Whiteman, P.I., **Complementary modes of air/ground transport mechanisms in Antarctic logistics support,** International Polar Transportation Conference (IPTC 86), Vancouver, Canada, May 4-8, 1986. Proceedings. Vol.1. Edited by A. Cassidy, Vancouver, B.C., D.F. Dickins Associates, 1986, p.376-419, 16 refs.

The style and content of logistics support for Antarctic field activities is critically dependent upon a careful coordination of air and ground transportation modes. Available financial resources limit the choice of suitable complementary vehicles and ensuing modus operandi. The British Antarctic Survey in particular has developed a system of Antarctic field operations which virtually excludes the use of rotary winged aircraft, in distinct contrast to the methods of other Antarctic nations. Comparative analyses of different nations' systems of operations provides a rationale for the BAS approach in terms of cost-effectivcness for scientific output achieved, but at the unavoidable expense of a restriction of accessible geographical area, and numbers of field staff supportable in a given field season. A proposal to expand field operations in these two vital respects without an unacceptable sacrifice of cost-effectiveness is outlined.

G-34997
Bresnahan, D.M., **Aircraft support of research in Antarctica,** International Polar Transportation Conference (IPTC 86), Vancouver, Canada, May 4-8, 1986. Proceedings. Vol.2. Edited by A. Cassidy, Vancouver, B.C., D.F. Dickins Associates, 1986, p.473-494, 3 refs.

The aircraft support system of the U.S. Antarctic Program is described, with emphasis on the Lockheed LC-130 Hercules aircraft, the backbone of the system. The aircraft is described and illustrated and details are provided on hours flown, the landing fields (locations, dimensions, markings, communication and other facilities, etc., described in text and diagrams), intercontinental flights, enroute procedures, emergency procedures, survival equipment, restrictions, and airborne research capabilities. The combined use of the LC-130 aircraft and the UH-1N helicopter is seen as providing an unmatched logistics capability.

G-34998
Brune, E., ***Icebird*--a new generation of polar resupply vessel,** International Polar Transportation Conference (IPTC 86), Vancouver, Canada, May 4-8, 1986. Proceedings. Vol.2. Edited by A. Cassidy, Vancouver, B.C., D.F. Dickins Associates, 1986, p.512-522, Includes discussion.

The M.V. *Icebird* was designed to fulfill the concept of enabling increased efficiency in the logistics of supplying established polar stations, including Antarctica, the rapid establishment of new stations or alternatively a self supporting polar cargo ship. This concept required a vessel which was of high ice class, could accommodate large number of expeditioners, allow helicopter operations, efficiently handle cargoes both liquid and dry (mobile containerized or bulk) while still allowing the vessel to maintain its maximum deadweight and cubic capacities. Its record after two Antarctic seasons chartered to the Australian Department of Science for the resupply of Australian Antarctic stations has proven the success of this vessel. A detailed description of the vessel is given.

G-34999
Wubbold, J.H., **Icebreaking operations in McMurdo Sound, Antarctica,** International Polar Transportation Conference (IPTC 86), Vancouver, Canada, May 4-8, 1986. Proceedings. Vol.2. Edited by A. Cassidy, Vancouver, B.C., D.F. Dickins Associates, 1986, p.523-530, Includes discussion.

Icebreaking capabilities and conditions of operation of the U.S. Antarctic Support Program are briefly outlined and illustrated. The discussion deals with radar capabilities and safety factors.

G-35000
Mercer, C.L., Woodfield, T., **Operating and design considerations for Antarctic resupply vessels,** International Polar Transportation Conference (IPTC 86), Vancouver, Canada, May 4-8, 1986. Proceedings. Vol.2. Edited by A. Cassidy, Vancouver, B.C., D.F. Dickins Associates, 1986, p.531-547, Includes discussion.

The Antarctic resupply multi-purpose vessels should incorporate the facilities (a) to operate in ice filled areas; (b) to carry dry cargo; (c) to act as a tanker; (d) to act as an aircraft (viz helicopter) carrier; and (e) to be completely self-discharging. A case is put forward for

using ice-strengthened vessels as against icebreakers. Safety, the non-suitability of the present classification rules for Antarctic resupply vessels, and the need for suitable experience, particularly in this unique Antarctic environment are discussed. (Auth. mod.)

G-35001

Suhrmeyer, L., Kohnen, H., **Operating experiences with the *Polarstern* in Antarctica,** International Polar Transportation Conference (IPTC 86), Vancouver, Canada, May 4-8, 1986. Proceedings. Vol.2. Edited by A. Cassidy, Vancouver, B.C., D.F. Dickins Associates, 1986, p.548-562, 1 ref. Includes discussion.

R.V. *Polarstern* is an icebreaking research and supply vessel commissioned 1982 by the Federal Republic of Germany to carry out scientific missions in both polar regions. The Alfred-Wegener-Institut for Polar and Marine Research in Bremerhaven is responsible for the missions. R.V. *Polarstern* is a double hull icebreaker powered by 19 200 shaft hp which enable the ship to operate in ice covered waters breaking ice up to 3 m thickness. The basic dimensions, the maximum displacement and the maximum speed of the ship are given. *Polarstern* can operate on sea 100 to 120 days without resupply and refueling. Various laboratories and other research facilities allow 30 to 40 scientists to carry out investigations in biology, fishery research, geology, geophysics, meteorology and oceanography. Up to six cruises are performed annually.

G-35002

Ishizawa, K., **Operating performance of the Antarctic icebreaker *Shirase* and highland traverse by snowvehicle,** International Polar Transportation Conference (IPTC 86), Vancouver, Canada, May 4-8, 1986. Proceedings. Vol.2. Edited by A. Cassidy, Vancouver, B.C., D.F. Dickins Associates, 1986, p.563-578, 1 ref. Includes discussion.

A new icebreaker *Shirase* was built in 1982 in replacement of the icebreaker *Fuji*. On the occasion of this replacement, both strengthening of propulsion power and expansion of the hull were done to ensure the ability to approach Showa Station and to satisfy the requirement for cargo space. The vessel is described in detail and shown in a diagram. These icebreakers serve for the transportation of personnel and cargos to and from Antarctica and onboard researches of the Japanese Antarctic Research Expedition. Scientific research in the Antarctic inland area was mainly carried out with the support of oversnow vehicles of SM50 type, design of which is mentioned.

G-35003

Wikander, L., **Cruise ships in arctic and antarctic waters,** International Polar Transportation Conference (IPTC 86), Vancouver, Canada, May 4-8, 1986. Proceedings. Vol.2. Edited by A. Cassidy, Vancouver, B.C., D.F. Dickins Associates, 1986, p.579-589.

Today about 3,000 passengers annually visit Antarctica and about 250 have gone through the Northern Passage. The Arctic requires even more careful planning than the Antarctic due to the more vicious ice conditions. Most of the sea ice in the south is first year ice which breaks up, drifts north and melts. Eighty percent of Arctic first-year ice freezes to become old ice—the percentage in Antarctica is about 20-30%. It is important that masters know enough to realize when they are out of their realm and retreat.

G-35004

Pusch, A.A., **Design of tracked firefighting vehicles for the Soviet Arctic,** International Polar Transportation Conference (IPTC 86), Vancouver, Canada, May 4-8, 1986. Proceedings. Vol.2. Edited by A. Cassidy, Vancouver, B.C., D.F. Dickins Associates, 1986, p.649-669.

Canadian Foremost Ltd. is a polar transportation specialist with experience in vehicle design for both the Arctic and Antarctic regions. Vehicles in both the tracked and high flotation rubber tire product lines are currently in use in the Canadian and U.S. Arctic, the northern regions of the U.S.S.R. and the Antarctic. This paper focuses on the design of the Foremost Husky 8 Fire Fighting vehicles manufactured specifically to satisfy the operational and logistical requirements of the Soviet Union's Arctic regions. Package performance criteria, initial and final design, and testing for the polar (summer/winter) high mobility tracked vehicle are discussed. Additionally, major ongoing international research projects in arctic and antarctic transportation are reviewed. Transportation logistics and operational experiences will be touched upon. (Auth.)

G-35007

Doolittle, J.H., **Development of an automatic geophysical observatory for use in Antarctica,** *Lockheed Missiles & Space Company. Technical report,* May 1986 LMSC-F171145, 67p., 7 refs.

Details are given for the design, operation, maintenance, transport, deployment to and recovery from remote regions such as Amundsen-Scott Station. Cutaway sketches are included of numerous parts and systems within the observatory. Data acquisition and dissemination capabilities are shown and discussed.

G-35052

Dibbern, J.S., **Feasibility report: operation of light air cushion vehicle at McMurdo Sound, Antarctica,** *U.S. Army Foreign Science and Technology Center. Letter report,* Feb. 6, 1987 AST-1150R-100-87, 139p.

This report explores the viability of the use of an air cushion vehicle (ACV) or hovercraft to perform logistic and scientific support in the area of McMurdo Station. After a review of personnel assets and facilities at McMurdo Station to support the ACV plus a reconnaissance of the five major routes selected, it appears that an air cushion vehicle in the 1 to 1 1/2 tonne payload class would be of significant value to support operations. It would reduce transit times for surface vehicle traverses on the routes selected and reduce requirements for expenditure of helicopter flight time in others. Of major significance is the ability to handle passenger/shuttle requirements between the Scott Base transition and Williams Field Skiway. Use of the ACV for high frequency passenger operations would help preserve the snow road for cargo operations during periods of road deterioration. Purchase of such a vehicle is recommended for field operation during 1987/88 season. (Auth.)

G-35054

Sharma, S.S., **Criteria for selection of site for construction of structures on a floating ice shelf in Antarctica—a case study,** International Offshore and Navigation Conference and Exhibition, Helsinki, Oct. 27-30, 1986. POLARTECH '86. [Proceedings], VTT Symposium 73, Espoo, Valtion teknillinen tutkimuskeskus, 1986, p.298-311, 5 refs.

The coastal regions of Antarctica, where substantial deposits of oil and other minerals are reported, consist of a number of ice shelves. Such areas encounter severe weather conditions and flow of the ice shelf, which severely affect the life of the structure/installations. The Indian Antarctic station Dakshin Gangotri, located in East Antarctica at 70 S 12 deg 05' E, lies on one such ice shelf. The paper brings out the criteria which should be kept in mind while selecting the site of a structure on an ice shelf and reports a case study for selection of a site for the Indian research station Dakshin Gangotri in Dec. 1983 in which the author was involved as the leader of the first wintering party.

G-35091
Bone, D.G., **LPHR system for adult antarctic krill *(Euphausia superba)***, *British Antarctic Survey. Bulletin,* Nov. 1986 No.73, p.31-46, 26 refs.

A large Longhurst-Hardy plankton recorder (L-LHPR) designed specifically for catching antarctic krill together with its method of operation and catch sorting is described. The system is switched on/off while being towed using an IOS acoustic net monitor. The net monitor also provides environmental data. The problem of coping with the wide range of krill densities encountered is discussed together with problems of net avoidance by krill generally and in relation to this net in particular. Results are given that indicate that the efficiency of the L-LHPR, in terms of catching ability at least, is as good as the IOS RMT system. The validity of density estimates derived from these nets is discussed. (Auth.)

G-35111
Barclay, D.D., comp, **Guide for extreme cold weather operations,** Norfolk, Naval Safety Center, July 1986, c450p., Refs. passim.

The guide consists of a collection of booklets, flyers, maps, charts, pamphlets, articles and manuals intended to help better prepare to deploy to the Polar regions. The information provided is grouped and addressed by primary areas of concern, such as working and surviving in extremely cold environment; aircraft and systems; operating surfaces; and unique operational considerations. An instructional program for U.S. Navy Medical Department personnel on cold weather medicine, as well as instructions for cold weather injury, prevention, detection and first aid, are included.

G-35208
Katsuta, Y., Terai, K., **Development of the low power data logger for the antarctic use,** *Antarctic record,* Nov. 1986 30(3), p.175-188, In Japanese with English summary and captions. 3 refs.

A project, "Development of Unmanned Observation System Utilizing Natural Energy" was carried out to obtain fundamental knowledge and techniques of unmanned observation systems in Antarctica from 1982 to 1984. A data logger for discontinuity data of long time range was developed as a part of the project. The data logger is required to achieve very low consumption of electricity and long-term recording period because it is very difficult to obtain large electric power constantly. A new data logger system has been designed and tested in Antarctica. Good results have been obtained experimentally during the 26th and 27th JARE, 1984-1986. (Auth. mod.)

G-35333
Swan, R., **In the footsteps of Scott,** *National geographic magazine,* Apr. 1987 171(4), p.545-555.

A team of three young lads set out to follow Robert Scott's route to the South Pole, including *en route* stops at Cardiff, Cape Town, and Port Lyttleton during *Southern Quest's* voyage to the antarctic starting point at Cape Evans. On the trek each of them hauled a 42 lb sledge loaded at the outset with 311 lbs of food and gear. They travelled, as did Scott, without means of radio communication across the Ross Ice Shelf to Beardmore Glacier through the Transantarctic Mountains onto the Polar Plateau to the Pole. Averaging about 12.5 mi/d, the nearly 900 mi walk took over 70 days. This account of the traverse is couched in terms of struggle against the elements, each pitting his own strength and determination against the harsh environment. Scott's words are often recalled on a journey in which each day was like the one before and the one after in a dozen perilous ways. Success was achieved but not without cost in anxiety, injury, and disappointment. The disappointments were especially sharp: hoping and expecting to be utterly alone the entire trip, they met a scientific field party on Beardmore Glacier; at the moment of success arriving at the Pole, they were told of the sinking of the *Southern Quest* with all of their equipment.

G-35388
Ledingham, R.B., Keage, P.L., **New portable shelters for polar use,** *Northern engineer,* Spring 1986 18(1), p.28-31, 3 refs.

A new free-standing, igloo-shaped portable shelter for polar use is described. The shelter, known as the "Igloo Satellite Cabin," is of glass-fiber construction, able to be sited on irregular terrain, and to be extended laterally using additional side and floor panels. It provides comfortable shelter for three people and basic shelter for a large number. In addition to the versatility provided by the shelter's design and construction method, it also offers the major advantage of the ability to be airlifted by helicopter to remote and climatically extreme localities. The ease of portability allows the shelter to be redeployed a number of times during a summer field season. Details of construction, assembly and transportation are provided.

G-35397
Carsey, F.D., Zwally, H.J., **Remote sensing as a research tool,** NATO Advanced Study Institute on Air-Sea Interaction, Acquafredda di Maratea, Italy, Sep. 28-Oct. 10, 1981. Proceedings. Geophysics of sea ice. Edited by N. Untersteiner. NATO ASI series, Series B: Physics, Vol.146, New York, Plenum Press, 1986, p.1021-1098, Refs. p.1082-1091.

Remote sensing technology has progressed so far and so rapidly during the last two and a half decades that risky, costly, and time-consuming *in situ* measurements of sea ice have been all but rendered obsolete. Basic issues of air-sea-ice interactions are circulation of atmosphere and ocean, climatology, and material response. Methods for studying these facets are ambient visible light, thermal infrared, passive microwave, active microwave, and altimetry. These issues and methods are defined and discussed. Most applications cited deal with Arctic regions, but numerous, scattered examples showing antarctic pertinency are included.

G-35404
Glen, I.F., Menon, B., Roots, T., **Summary of the results of the Canadian participation in the Polar Class trafficability program, 1981-1985,** *Transport Canada. Report,* Oct. 1986 TP 7471E, 63p., With French summary. 13 refs.

This report contains a review of Canadian research conducted from 1981 to 1985 on the loads on and responses of ship hull structures and appendages in ice, based on data from dedicated full-scale trials on U.S. Polar Class icebreakers in the Arctic and the Antarctic. In this review, a complete account of the data collected in each year's trials is given, identifying what parts of the data have been analyzed along with what further analysis is required. The report covers the principal subject areas addressed by the Canadian research program: structural loads and response of appendages, including steering gear and maneuvering performance in level ice. The results of the work have led to a greater understanding of the dynamic response of icebreaker hulls, propulsion system and steering gear to ice impact, and provided a full-scale data base. As well as providing specific performance data for the vessels in thick level ice, the maneuvering tests have been used to develop semi-empirical mathematical models for turning in ice.

G-35414
Grappling with ice, *Soviet shipping,* Jan.-Mar. 1986 6(1), p.38-39.

Details of the entrapment of the Soviet ship *Mikhail Somov* in the ice off the coast near Russkaya Station, in Mar. 1985, are presented. The rescue operation was successfully carried out by August by the icebreaker Vladivostok, aided by helicopters and satellite information on ice conditions. In spite of the length of the ordeal, no damage to ship or crew was suffered.

G-35471
U.S. Naval Support Force, Antarctica, **Operation Deep Freeze 87 end of season report,** 1987, Var. p.

The report of Operation Deep Freeze 87 provides a chronological summary of the activities of naval units supporting the U.S. Antarctic Research Program during the 1986-1987 austral summer season. These activities included providing basic life support requirements of food, shelter, water, heat and medical services to McMurdo residents and the resupply of McMurdo, Amundsen-Scott, Byrd and Palmer stations. Support to Scott Base is also reported. Recommendations are made to improve the capabilities of the forces involved and to improve the preservation of costly personnel and material resources.

G-35551
Doolittle, J.H., Mende, S.B., **Development of an automatic geophysical observatory,** *Antarctic journal of the United States,* 1985 20(5), p.229-231, 3 refs.

The United States experience with unmanned facilities in remote locations is reviewed from the Stanford University prototype of 1969. Problems and improvements over the years are discussed. A new design with expanded facilities and capabilities is described.

G-35562
Cassidy, D.S., **Antarctic Marine Geology Research Facility and Core Library, 1984-1985,** *Antarctic journal of the United States,* 1985 20(5), p.251-252, 9 refs.

The Department of Geology at the Florida State University has been involved for more than 25 years as a facility for antarctic sediment studies. Core collections amount to more than 16,000 meters and more than 1,000 ocean bottom samples are available for study by scientists from around the world. A list is included of samples provided during the 1984-85 period, along with one of newly acquired samples. Other activities include visits by representatives from other facilities and the preparation of descriptions of samples from earlier research seasons.

G-35571
Comberiate, M., **Satellite communications for antarctic science,** *Antarctic journal of the United States,* 1985 20(5), p.262-263.

Scientists and engineers are interested in using new capabilities to communicate with instruments in the field in near real time from their personal computers in the continental United States. This capability, referred to as *telescience,* is a key objective of the space and ground-based science communities in general, but until now it has not been possible to project its availability in Antarctica. The satellite data link in operation at the South Pole is described and shown in a diagram. The National Science Foundation has chosen to install a commercial geostationary satellite link from the edge of Antarctica at both McMurdo and Palmer Stations. The long-term availability of these links is commercially insured and as such considered cost-effective.

G-35572
Becker, R.A., **Antarctic support operations,** *Antarctic journal of the United States,* 1985 20(5), p.264-265.

The 1984-1985 austral summer marked ITT/Antarctic Services, Inc. (ANS) fifth year of support services to the U.S. Antarctic Research Program. In the continental area, ANS operated and maintained facilities at Williams Field, McMurdo Station, South Pole Station, Siple Coast, and Beardmore Glacier, the site for the international workshop on the Antarctic Treaty System. Support efforts in the Peninsula area entailed operation and maintenance of Palmer Station and the *R/V Polar Duke.* Specific construction and renovation projects were either begun, continued, or completed at all locations. Support of annual scientific investigations was also an ANS responsibility. During 1984-1985, 333 ANS employees deployed to Antarctica. ANS also arranged deployment of 451 National Science Foundation sponsored grantees affiliated with 105 research programs.

G-35573
Harler, R.M., **U.S. Navy support to the U.S. Antarctic Program during 1985-1986,** *Antarctic journal of the United States,* 1985 20(5), p.265-266, 1 ref.

Based at the Construction Battalion Center, Port Hueneme, California, the Naval Support Force, Antarctica, (NSFA) is composed of 40 officers and 251 enlisted personnel with backgrounds in fields as varied as carrier aviation, meteorology, medical, construction, and supply. The Navy's mission in Antarctica is to provide operational management and control of those logistic support functions provided by Department of Defense and U.S. Coast Guard assests, a mission that entails developing fiscal, logistic support, and operations plans in response to tasking from the National Science Foundation, which funds and manages the national program in Antarctica. These plans also include consideration for safety of life and property, U.S. national objectives, requirements of the Antarctic Treaty, and cost effectiveness. During austral summer 1984-1985, the Navy participated in operations at all U.S. antarctic stations and operated Marble Point Air Facility and Byrd surface camp with all-Navy crews. A station-by-station review of Navy support in Antarctica is included.

G-35574
Fisher, D.D., **U.S. Navy Antarctic Development Squadron Six activities, 1984-1985,** *Antarctic journal of the United States,* 1985 20(5), p.267.

Using LC-130 and UH-1N aircraft VXE-6 crews amassed 4,517.8 flying hours, transporting 4,075,465 lbs of cargo and 4,162 passengers, and supported eight separate field projects, in addition to many others which involved combined glaciological programs on Siple Coast.

G-35575
Marthaler, J.G., **Ship operations,** *Antarctic journal of the United States,* 1985 20(5), p.267-269.

Two U.S. Coast Guard icebreakers operated in the Antarctic in the 1984-1985 season in support of the U.S. Antarctic Program. *USCGC Polar Star* resupplied and refueled Palmer Station, performed the channel break-in to McMurdo Station, assisted in the escort of the resupply ships *USNS Maumee* (a tanker) and *M/V Green Wave* (a cargo ship) into and out of Winter Quarters Bay, and conducted three science cruises, one in McMurdo Sound, one in the Ross Sea, and one off the Oates Coast. The U.S. Coast Guard icebreaker *Glacier* delivered the initial supply and wintering crew relief to Palmer Station and conducted an extensive science support program from the South Orkney Islands along the western Antarctic Peninsula to the Bellingshausen and Amundsen Seas. A detachment of two HH-52A helicopters from the Coast Guard Aviation Training Center, Mobile, Alabama, was assigned to each icebreaker. AVDET 104 operated from *Glacier,* and AVDET 105 operated from *Polar Star.* The tank ship *USNS Maumee,* an old antarctic veteran, and the dry-cargo ship *M/V Green Wave,* on her maiden voyage to Antarctica, supplied fuel and cargo to McMurdo Station. Details of the operations are given.

G-35595
Menon, B., Edgecombe, M., Tue-Fee, K., Glen, I.F., **Manoeuvring tests in ice aboard USCGC *Polar Star* in Antarctica, 1985,** *Transport Canada. Report,* Oct. 1986 TP 8297E, Arctec Canada, Ltd., FR1723C-2, 44p. + appends., With French summary. Refs. passim.

This report describes a comprehensive program of assessment of the manoeuvring performance of Polar Class vessels involving full-scale, level ice turning trials as well as development of mathematical models to predict steady turning radius. The trials were carried out in McMurdo Sound, Antarctica, which generated 19 data points. Two mathematical models were developed, one making use of a time history method utilizing approximate model test data for hull coefficients. The second model makes use of a force balance method involving an assumed hull-side force distribution. Preliminary comparisons of the predicted and measured turning radii have been made. Analysis of the full-scale data showed that further controlled tests at larger rudder angles will be required for complete validation of the mathematical models. (Auth.)

G-35636
Kueffner, J.H., **Wind hybrid power system for antarctic Inmarsat link,** INTELEC '86, International Telecommunications Energy Conference, Oct. 19-22, 1986, Toronto, Canada. Proceedings, New York, Communications Society of the Institute of Electrical and Electronics Engineers, 1986, p.297-298.

The design parameters, installation, and operating history of the power system installed for the remote Earth station at Black Island, are discussed. The relocation of the primary Pacific Basin Inmarsat satellite required that the Inmarsat Earth station at McMurdo Sound be moved to maintain line-of-site communications. Since Mount Erebus (3796 m) obstructed the beam path in the vicinity of McMurdo Station where power was available, an alternate remote location was chosen for the terrestrial and satellite link equipment. A MicroGrid hybrid wind/vapor turbine generator system provides all the power and environmental control required at this extreme location.

G-35745
Murayama, H., **Report of the research trips at the coastal ice-free area by the 26th Japanese Antarctic Research Expedition in 1985,** *Antarctic record,* Mar. 1987 31(1), p.55-66, In Japanese with English summary. 3 refs.

Coastal research trips were frequently carried out by 26th JARE members for monitoring the antarctic environment. The research area was the east coast of Lützow-Holm Bay. The scientific aims of these trips were the study of five ponds which were selected as the monitoring stations in 1978, and the census of Adélie penguins and seals. In the present paper an outline of the trips is reported. (Auth.)

G-35900
Seppianen, E., **Ship for scientific expeditions to Antarctica** [Nauchno-ekspeditsionnoe sudno dlia Antarktiki], Chelovek, more, tekhnika (Man, sea, technology) edited by A.A. Narusbaev, Leningrad, Sudostroenie, 1987, p.244-246, In Russian.

A new Soviet research vessel, under construction in Finland, is described, which will be operational by the end of 1987 and will be replacing the research vessel *Mikhail Somov.* The new ship will be equipped to navigate through open and icy waters up to -40 deg. and carry out hydrologic, biological, atmospheric, meteorological and glaciological research in the Antarctic. It is designed to transport 250 passengers, including 90 scientists and their equipment, helicopters and other aircraft, tanks and other material for research stations. The ship's measurements, which are given, allow for the installation of 4 cranes, 2 with a 50-ton capacity and 2 with a 10-ton capacity each.

G-36057
Ishidou, M., Tanaka, M., Kashiwagi, H., Oohi, T., **Attitude detection by horizon aspect sensor on board rockets launched at antarctic Syowa Station,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 9th, 1986, edited by M. Ejiri, p.22-25.

Sounding rockets S-310JA-8, -9 and -10 launched at Showa Station were equipped with horizon aspect sensors and geomagnetic aspectometers to determine their attitudes. The paper reports the rocket pitch angles between the rocket axis and the vertical at the rocket position determined from the experimental results of the horizon aspect sensor, which could detect the horizon of CO2 gas layer in the atmosphere. (Auth.)

G-36064
Nozaki, K., Kikuchi, T., **New multimode FM/CW ionosonde,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 9th, 1986, edited by M. Ejiri, p.217-224, 12 refs.

A low power FM/CW ionosonde was constructed to investigate the vertical motion of the polar ionosphere. The most suitable pulse length is selected automatically according to the ionospheric layer height. Microcomputer control and data acquisition make it possible to select observation mode easily by changing software. A good deal of effort was made to eliminate interference with other observations and short wave telecommunications and by other emissions on neighboring spots. (Auth.)

G-36078
Schultz, D.G., Powell, L.A., Bentley, C.R., **Digital radar system for echo studies on ice sheets,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.206-210, 10 refs.

A digital radar system comprising multiple microprocessors, for use with 50 MHz radar units modified from the Scott Polar Research Institute Mark IV design, is described. The major features of the system include coherent integration of radar traces, storage of data in raw digitized form without demodulation, real-time play-back of digitized information, and high system performance resulting in good spatial sampling with integration even in airborne operations. Unfocused synthetic beam shaping also results from the integration of echoes, thus reducing clutter or incoherent scattering from the sides of the beam pattern along the profiling track. Examples of data collected during the austral summer of 1985-86 in the Antarctic on ice stream B, in both ground and airborne programs, illustrate both the flexibility in data presentation and features present in the records. (Auth.)

G-36185
Australian National Antarctic Research Expedition, Potter, S.A., ed, **ANARE antarctic field manual (3rd ed),** Kingston, Tasmania, 1987, 140p.

In 16 chapters the manual points out the many catastrophic pitfalls waiting to entrap the unknowledgeable or unwary expeditioner, how to avoid them, and how to defeat them if avoidance fails. Among others, the topics include the nature and use of various pieces of camping gear; oversnow/ice transport; Australian antarctic stations and closeby refuges; navigation, communications, search and rescue,

and emergency procedures; and environment protection. Appendix I is a Field Camp Equipment List which could also serve as a glossary of terms to be mastered. Appendix II is a table of distances, weights, and volumes in English and metric units.

G-36259

Araújo, F.S.N. de, Cuglovici, R., **Comandante Ferraz antarctic station: the pioneer use of container modules for construction in the South Shetland Islands,** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.219-227.

Habitable container modules, designed to provide lodging, space for leisure, and research facilities in the 1st Brazilian antarctic research station "Comandante Ferraz" are described. The containers are easily transported, ready to be used and do not require great effort to be set up at their destination. The modules were installed during the summer of 1983/84 and proved to be versatile and functional, providing great comfort for living and working. It is suggested that what makes this kind of structure extremely flexible and functional is the absence of foundations and its unique, stable modular design. (Auth. mod.)

G-36272

Roper, C.A., **Fibre optics cable in Antarctica,** *New Zealand antarctic record,* 1987 7(3), p.48-51.

Fibre optics cable, because it is non-metallic and radiation (noise) is confined to the fibres, is well suited for detecting very small signals in Antarctica. Experiments in such detecting are conducted at Arrival Heights. Although manufacturing a fibre optics cable and laying it between Arrival Heights and Scott Base is expensive, the long term gain compensates for the high cost. Details are given of the problems associated with metallic cables, the switch to the fibre optics cable, the costs, construction and transport of the 3,813 m cable, and laying and connecting it.

G-36299

Nayak, M.R., **Antarctic communication,** *Acta astronautica,* Aug. 1987 15(8), p.587-591, 7 refs.

A new all solid-state generation of satellite communication equipment (Debeg 3211) is available today to meet the requirements of reliable communication—telex, voice and slow-scan video transmission. The equipment operates with all C-band (4-6 GHz) domestic satellites. This type of satellite terminal has opened up a whole new era of private reliable communications from Antarctica. Maritime satellite communication provides a number of advantages over the conventional radio communications. Among them are: instantaneous, high-quality service at any time of the day or night, unaffected by weather or ionospheric disturbances; privacy of communications; direct dial capability for voice and telex communications; interconnection of services to the worldwide public telecommunications networks. (Auth. mod.)

G-36391

Sanchez Alvarez, J.C., **Oceanographic research vessel of 2,700 tons** [Buque de investigación oceanográfica de 2.700 t], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.417-424, In Spanish with English summary.

The plan is presented of an oceanographic research vessel capable of operations in ice covered waters. The project is being carried out according to requirements established by different Spanish oceanography research centers. The discussion covers the description of the ship, its dimensions, velocity, crew, electrical installations, navigation and communication equipment, and a data collecting and processing system. (Auth. mod.)

G-36419

Day, C.F., Sweeney, R., Towles, W.T., **Zero Base II analysis,** *RMC Research Corporation. Report,* June 1973 UR-213, 62 leaves, variously paged.

This report presents the results of Task M under contract NSF-C681. It assesses the impact that an ice runway located near the Dufek Massif would have on antarctic support operations. The analysis has been completed in two stages. The first, or core analysis, examines the alternative uses of the Dufek ice runway to support the proposed Dufek Drilling Project and Pole and Siple Station resupply. The second stage of the analysis takes into account the other antarctic research programs and so assesses attractive alternatives identified in the core analysis in the context of overall antarctic operations. The core analysis examines some 22 alternative uses of the Dufek ice runway ranging from the major base for supporting Pole and Siple to an LC-130 base for supporting only the drilling project. The results of the analysis and the utility of the planning model are discussed. Details of the methods used, cost and planning factors applied, and the basic calculations are contained in 3 appendixes: Appendix A includes the core analysis, Appendix B defines the support requirements for the Dufek ice runway itself, and Appendix C completes the second stage or overall program analysis. (Auth.)

G-36491

Fleming, A.J., Keage, P.L., **Protected area marker for polar use,** *Polar record,* Sep. 1987 23(147), p.716-718, 2 refs.

A protected area marker prototype has been developed by the Australian Antarctic Division from a Canadian reserve boundary marker. The canister is a 125 mm x 400 mm welded (agricultural) aluminium tube section with a 19 mm thick aluminium cap; the stepped lip of the cap is machined to take a 'nitrile' rubber sealing ring. The base of the canister is a 10 mm thick aluminium plate, press-fitted and sealed with epoxy glue, and attached to an aluminium scaffold tube (48 mm outside diameter, 39 mm inside) by a threaded one-and-a-quarter inch BSPS mild steel sleeve. The sleeve screws into the bottom plate, which has a concave inside floor. Thus any moisture entering the canister drains to the inside of the scaffold section. Guys are attached to 3 lugs on a steel collar bolted just below the threaded sleeve. The marker is expected to withstand winds in excess of 150 knots. A powdered epoxy anti-corrosion paint is baked onto the canister or the complete marker. A sketch of the marker is included. (Auth.)

G-36519

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic operations manual,** Christchurch, 1986, 57p.

The manual lays out a set of personal responsibilities for individuals visiting Antarctica or remaining over the winter. Personnel should be familiar both with statutory requirements and with Antarctic Division regulations as guides for them in their actions while working within the NZARP. Interpretations of these requirements and regulations are included in the manual.

G-36520

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic field manual,** Christchurch, 1986, 86p.

The manual provides a composite compilation of experience in travelling, camping, working, and communicating in the harsh, changeable antarctic environment. The emphasis is ever on safety in all activities. Guidance is also given on selecting an appropriate

place name for a newly found geographic feature should one be discovered.

G-36530

Müller, F.W., **Antarctic personnel** [Los antárticos], *Antártida,* June 1987 No.15, p.50-54, In Spanish.

After a brief review of antarctic geography and environment, the importance of adequate alimentation, clothing and shelter for the scientists working in Antarctica is stressed. A description of two types of polar construction, those on rocks and those on snow, as well as a description of the igloo and sketches of a tubular model of housing is given, followed by information relative to the sources of energy and heat.

G-36583

Godley, W.L., Van Lieshout, P., **Wind power in Antarctica,** *Telephony,* June 22, 1987 212(25), p.28-29, 32, 34.

Installation and operation of a hybrid power system, combining wind and turbine generators to run McMurdo Station's remote satellite earth station and microwave equipment, are described.

G-36704

Shibuya, K., Yoshida, Y., **Digital data acquisition system of the Japanese antarctic research aircraft Pilatus Porter PC-6,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.15-22.

Digital Data Acquisition System of the Japanese antarctic research aircraft (JARDAS) was developed and installed on Pilatus Porter PC-6. JARDAS consists of 8 interfaces with external navigational and observational devices, data processor and data cartridge. As for the 4 channels of analog devices, DC voltage outputs from the radar altimeter, atmospheric pressure transducer, thermometer and vertical-gyro system are analog-to-digital converted in the data processor. As for the 4 channels of digital devices, data from the ULF/omega receiver, GPS receiver, proton magnetometer and ice radar video pulse digitizer are selected, code-transformed and rearranged to make one data block sequence. The one data block corresponds to 1 s sampling data, and consists of 1 byte of start mark, 150 bytes of 7-bit with even parity ASCII data for navigational and geomagnetic total intensity data, 658 bytes of binary data for ice radar video pulse waveform 1 and 2 bytes of end mark, which amounts to a total of 811 bytes. JARDAS can record 12 hrs' output data blocks continuously on one 450 ft (7700 bpi) 3-M type cartridge tape. (Auth.)

G-36718

Kitagawa, H., **Full-scale measurements on the Shirase (icebreaking test of the Shirase),** *Polar news,* Feb. 1986 No.42, p.53-55, In Japanese.

Full-scale measurements have been made with the Japanese antarctic research vessel "Shirase" in the antarctic region to investigate ship performance in ice-covered waters. A primary objective is to study icebreaking performance and ship-model correlation. Propulsion performance and motions of the ship have been measured. Mechanical properties of sea ice such as compressive and flexural strengths have also been examined. The results are expected to be useful for the ship operation and the study of large icebreaking tankers which will be in service in the arctic seas in the 1990s. The background and outline of the project are presented.

G-36736

Picorelli Figueiredo, L.C., **Brazilian Air Force in Antarctica** [A FAB na Antártica], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* July 1987 No.11, p.3-6, In Portuguese.

A brief historical review is offered of the participation of the Brazilian Air Force in the antarctic program PROANTAR, beginning with Brazil's entry into the Antarctic Treaty in 1975 and the installation of Ferraz Station in 1983. The drawbacks and dangers of antarctic research and transportation are outlined. An appeal is made for the construction of an airport near the Brazilian station, and for intensive training of transportation personnel in addition to those who are already being trained in foreign countries, such as Chile, Argentina and the United States.

G-36737

Rabelo de Souza, M., **Utilization of wood in Antarctica** [Utilização de madeiras na Antártica], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* July 1987 No.11, p.7-9, In Portuguese.

Various types of wood, used for construction and other purposes in Antarctica, were analyzed for their resistance to low temperature and humidity. Most affected is *Pinus* sp., vulnerable to fungus and insect attacks. To cope with the problem, 4 procedures are suggested: immediate replacement of defective parts, cause identification, preventive treatment of the wood, and enforcement of holding wood suppliers responsible for treating material properly.

G-36741

Nair, P.K., Gupta, H.K., **Dakshin Gangotri: the Indian permanent station in Antarctica,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.15-17 + diags. & photos, 8 refs.

In addition to carrying out investigations and observations in diverse scientific disciplines, one of the major responsibilities of the Third Scientific Expedition was to set up a permanent station in Antarctica to sustain continued scientific work during the winter months. This responsibility was given to the Corps of Engineers of the Indian Army. The double storeyed, two block station built over a raft foundation with a plinth area of 620 sq m was completed and facilities commissioned in a record time of 2 months. The first Indian antarctic wintering team, consisting of 12 members started its tour on Mar. 1, 1984. Two years of wintering have now been successfully completed by Indian teams in Antarctica during 1984 and 1985. This article describes the Indian station, Dakshin Gangotri, in Antarctica. (Auth.)

G-36761

Nayak, M.R., **Satellite communication—INMARSAT terminal,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.257-264.

INMARSAT operates a global marine communication service by means of 3 satellites in 1984 having a total capacity of approximately 339 channels (25 KHz channel separation). The ship earth station is used in the Indian Antarctic Research Station (land-based). The INMARSAT system consists of ground station-linked satellites in geostationary orbit 22,300 miles (35,700 km) above the equator over the Atlantic, Pacific and Indian oceans at longitudes of W 026, E 179 and E 063, respectively. The satellite communication terminal DEBEG 3211 consists of only 4 items: a telephone, teleprinter, electronics unit and antenna. Full technical specifications and details are given for: the terminal; the Slow Scan TV converter type DSC 2000; recommended spare parts needed for the antarctic station; and an inventory of parts and their locations for the station satellite terminal. (Auth. mod.)

G-36762
Singh, A., **Amateur radio operation during the Third Indian Antarctic Expedition 1983-'84,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.265-266.

A brief account is given of amateur radio activities including operations aboard the expedition ship *Finnpolaris* and from base camp on the ice shelf. Contacts were made on a regular basis with dozens of amateurs in cities throughout India, frequently with cities worldwide, and with most antarctic stations.

G-36802
Rauma-Repola in the Antarctic, *Shipping world and shipbuilder,* Jan./Feb. 1987 183(4030), p.27-29.

It is reported that the Soviet Union has ordered from Rauma-Repola's Rauma Shipyard the first vessel ever specifically designed for expeditions into antarctic regions. The delivery of the vessel is scheduled for late summer 1987. The design of the ship, and its functions, are described. The construction materials, machinery, and shape of the ship, designed for ice-going and tested in ice model tests, are discussed.

G-36809
Jeremy, R., McCracken, K.G., **Reception of remote sensing satellites in Australian Antarctic Territory, a technical feasibility study: final report,** *Australia. Commonwealth Scientific and Industrial Research Organization. Office of Space Science and Applications. COSSA publication,* Jan. 1987 No.010, 58p., For selected paper (Appendix 6) see 42-1650 or C-36810. 7 refs.

This report covers a technical and cost study of the facilities which would be required to receive at an Australian antarctic station, image and other data from the remote sensing satellites LANDSAT, SPOT and ERS-1. Subjects addressed in the study are: choice between Mawson, Davis, and Casey as the location for a receiving station; operational, scientific, and other uses (e.g. mapping) to which received data could be applied; data accumulation volumes, on-site processing, and potential transmission requirements; technical considerations (such as antenna size required); cost estimates for station acquisition and installation; operating cost estimates. (Auth.)

G-36814
New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic field manual,** Christchurch, 1987, 85p.

The most recent edition of the antarctic field manual continues the theme of its predecessors: safety is the name of the game in Antarctica. The manual is designed to advance the cause of safety by training personnel in the use of the tools, equipment, and methods which will enhance the safety and success of field trips; by stressing the importance of thorough, pre-departure planning; and by anticipating possible problems in the field and providing solutions. The emphasis is on the many facets of field travel and safety; field planning and logistics; and field communications. Safety is no surprise.

G-36834
Hatcher, G.P., **Assessing the usable life of an antarctic station,** *Antarctic journal of the United States,* Dec. 1986 21(4), p.6-9.

When to divert substantial funding from other projects and needs to build new facilities is a difficult decision. Such a decision-making situation is being anticipated with regard to Amundsen-Scott Station at the geographic south pole. The five factors affecting this decision are now being considered by the Naval Civil Engineering Laboratory. These factors are structural safety, operational safety, required operational capability, habitability standards, and annual costs. Preliminary assessment of the dome structure indicated that no structural safety problem will develop before the other four areas contribute more significant problems. If the other four areas were analyzed, a time for replacing the present station could be determined.

G-36868
Bindschadler, R., **Antarctic field tests on SARSAT personal locater beacons,** *U.S. National Aeronautics and Space Administration. Technical memorandum,* Oct. 1987 TM 4008, 15p. N88-10403.

Field tests of SARSAT personal locater beacons were conducted in the Antarctic to assess the viability of using these beacons to increase the safety of antarctic field parties. Data were collected on the extent to which dry or wet snow, melting conditions, crevasse walls and snow bridges affected the ability of the SARSAT satellite to calculate an accurate position of the beacon. Average response time between beacon turn-on and alert reception in McMurdo was between 4 and 5 hours for these tests. It is concluded that the SARSAT system is viable for antarctic operations and it is recommended that it be implemented for future field operations. Because obstruction of line-of-site between beacon and satellite degrades the accuracy of the location calculation (particularly in wet snow), it is further recommended that field parties have sufficient numbers of beacons to insure that in an emergency, one will be able to operate from the surface. (Auth.)

G-37026
Rosenberg, T.J., ed, Jezek, K.C., ed, **Polar communications: status and recommendations. Report of the Science Working Group,** MP 2322, Greenbelt, MD, U.S. National Aeronautics and Space Administration, Dec. 1987, 29p., 3 refs.

This report summarizes the capabilities of existing communication links within the polar regions, as well as between the polar regions and the continental United States. The report places these capabilities in the context of the objectives of principal scientific disciplines active in polar research and, in particular, of how discipline scientists both utilize and are limited by present technologies. Based on an assessment of the scientific objectives potentially achievable with improved communication capabilities, the report concludes with a list of requirements on and recommendations for communication capabilities necessary to support polar science over the next ten years. (Auth.)

G-37046
Honea, D.L., **Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica,** *Texas. University. Applied Research Laboratories. Technical report,* Dec. 15, 1987 ARL-TR-87-71, 31p., Semiannual report for the period Apr. 1-Sep. 30, 1987.

Project S-051 is an ongoing research project sited at McMurdo Station and substantially supported by Applied Research Laboratories at The University of Texas at Austin (ARL:UT). Primary project tasks center around the collection of data derived from the Doppler beacon transmitters on board polar orbiting navigational and geodetic research spacecraft. Subsequent reduction of the collected data provides continual monitoring of the position of these spacecraft. Data are reduced at a centralized network computing facility in the United States. For this reason, data communications play an important role in accomplishing project tasks. Two satellite communications links are used by S-051 for primary data and message relay. The South Pole Satellite Data Link (SPSDL) is used for relay of data from South Pole Station to McMurdo Station. The International Maritime Satellite Communications System (INMARSAT) is used to relay data and messages between McMurdo Station and the continental United States (CONUS). Routine project activities include manipulation of

the data sets in preparation for transmission to CONUS, and the operation of both the SPSDL and INMARSAT satellite communication systems to relay these data sets to CONUS. The general state of the observatory, problems and their solutions, and recommendations for improving the operation are presented. (Auth. mod.)

G-37176

Clark, M.K., **Speaking of research vessel communications,** *Sea technology,* May 1987 28(5), p.14-15.

Highlights are given of upgraded communications capability of three research vessels: *Polar Duke* operated by ITT Antarctic Services for National Science Foundation; *Seward Johnson* of HBOI, using an underwater telephone system for communication with submersibles; and NOAA's *Discoverer,* a survey and oceanographic research vessel. All three have satellite reception capability.

G-37178

Akai, K., Narita, S., ***Shirase* and icebreaking ship technology in Japan,** *Marine Technology Society journal,* Sep. 1987 21(3), p.12-19, 4 refs.

The *Shirase* is a combination icebreaker-research vessel. Experience accumulated over 18 years with the *Fuji,* its predecessor, went into the design of the new ship. The *Shirase's* main functions, hull form and structure, ice breaking performance, electric propulsion system, propellers, and hull fitting are described and illustrated. Antarctic activities of the ship since 1983 are outlined, notably a successful rescue operation to free the Australian vessel *Nella Dan* that had been icebound for over 50 days.

G-37179

Cosgriff, L.E., **Design features and bi-polar operation of the icebreaking resupply ship M/V *Icebird*,** *Marine Technology Society journal,* Sep. 1987 21(3), p.48-55.

M/V *Icebird,* the world's first vessel purposely built for polar resupply, in 1984 ushered in a new era in polar transportation and scientific expedition support. *Icebird's* design features and icebreaking capability allow unescorted operation in ice conditions that would preclude the use of either conventional or merely "ice strengthened" vessels of low ice class. This article discusses *Icebird's* principal features and reviews her performance over the past three years in both the Arctic and Antarctic. (Auth.)

G-37180

Brigham, L.W., **New Soviet Antarctic research ship *Akademik Fedorov*,** *Marine Technology Society journal,* Sep. 1987 21(3), p.88-91, 2 refs.

Design characteristics and facilities of the new Finnish-built Soviet ship *Akademik Fedorov* are described and illustrated. The ship's primary mission is to resupply Soviet antarctic stations. A table comparing the features of several antarctic resupply and research ships is presented.

G-37187

Oakley, E.H.N., **First antarctic winter in tents: the Joint Services Expedition to Brabant Island. Pt.3,** *Royal Naval Medical Service, London. Journal,* Spring 1987 73(1), p.43-49, 6 refs.

This final part of the account of the expedition describes experience and assessments of shelters, clothing, methods of travel, etc. Although the team lived throughout the winter in tents, a cardboard hut proved invaluable and easy to transport by air. The most robust design of tent was the Antarctic Pyramid, but this was not portable and proved cold in its lower regions. Lightweight dome tents were used for traveling, but needed protection from winds greater than 60 knots. Many different garments were taken. Although most were worn continuously for periods of three to nine months without their (or the underlying body) being washed, most performed very well. No subjective difference was observed between synthetic and natural fiber underwear in the face of these conditions. Foot and hand wear were less satisfactory. Insulation between body and ground was found to be very important in tents. Travel was largely achieved using ski-mountaineering techniques wearing rucsacs, and towing individual sledges (pulks). These enabled a lightweight, mobile and relatively cheap expedition, and should be considered for similar work in the future. (Auth.)

G-37325

Shugar, T.A., Holland, T.J., Shoemaker, N.F., **Collapse prediction analysis of South Pole dome due to foundation settlement,** *U.S. Naval Civil Engineering Laboratory, Port Hueneme, California. NCEL technical note,* Jan. 1988 N-1781, 34p. + 15p. appends., 31 refs.

The base of the geodesic dome sheltering the Amundsen-Scott South Pole Station is distorting due to movement in the compacted snow foundation. Determination of how much longer the dome can withstand ice field motion is aided by a nonlinear finite element analysis. A description of the base ring differential displacement is obtained by a least squares analysis of foundation displacement data. The topology and geometry of the geodesic dome have been reconstructed, and a one-to-one correspondence exists between the modeled and actual latticed framework. Two alternative approaches to structural modeling, based on the same topology, are developed and discussed. Computational results are obtained, and then displayed and analyzed using computer graphics. These results indicate that the South Pole Dome can withstand twice the load currently induced by existing foundation settlement. The structure exhibits isolated group buckling but is in no danger of general collapse at that load level. The actual level of settlement at which general collapse could occur could not be calculated. (Auth.)

G-37507

Guthridge, G.G., **Palmer: an Antarctic Peninsula research station,** *Antarctic journal of the United States,* Dec. 1981 16(4), p.1-6.

The development and evolution of Palmer Station and the northern segment of the Antarctic Peninsula are traced from discovery through sealing and exploration, scientific investigations, setting up of an early research station, and the eventual establishment of Palmer Station as a permanent enclave in 1965. Siting the station at Gamage Inlet marked the culmination of three years of planning to locate a station equal to the challenge provided by the biological richness of the Antarctic Peninsula. Construction of the RV *Hero* is noted, the station facilities are described, and the biological and geophysical programs which came into being at Palmer are outlined.

See also:
A-34757 A-34871 A-35326 A-37023 C-36080 D-35006 D-35327 D-35743 D-35772 D-36084 D-37014 D-37492 E-35211 E-35440 E-36980 F-34718 F-34727 F-34741 F-35296 F-35704 F-36081 F-36082 F-36233 F-36478 F-36873 F-36968 F-37006 F-37118 H-37485 I-34671 I-34674 I-34675 I-34676 I-35030 I-35210 I-35576 I-36083 I-36760 J-34713 J-37454 L-34770 L-34877

H. MEDICAL SCIENCES

H-34704
Broadway, J., Arendt, J., **Delayed recovery of sleep and melatonin rhythms after nightshift work in antarctic winter,** *Lancet,* Oct. 4, 1986 2(8510), p.813-814, 11 refs.

Disturbed sleep pattern (for 3 weeks, following 1 week of nightwatch duty) during the antarctic winter is reported. Concurrent with this, the 6-hydroxymelatonin sulphate rhythm was phase shifted. After nightwatch duty in spring, recovery was complete within a week. The subject of this investigation was one of the 19 men at Halley Station taking part in a longitudinal study of sleep, mood, and hormonal variations in Antarctica. The station has extended periods of 24 hour daylight in summer (mid-Oct. to Feb.) and 24 hour darkness in winter (may to mid-Aug.), together with very rapid changes in day length around the equinoxes. During the winter, the subject was not exposed to light intensities greater than 500 lux. Weekly measurements were made of duration and timing of sleep, using sleep logs, and sleep quality was assessed by visual analogue scales.

H-34792
Taylor, A.J.W., Robinson, R.D., McCormick, I.A., **Written personal narratives as research documents: the case for their restoration,** *International review of applied psychology,* Apr. 1986 35(2), p.197-208, With French summary. 18 refs.

The interpretation of personal narratives is compared with independently prepared assessments of clinical interviews, psychometric testing, and observations of a study of environmental stress (142 days in the Antarctic) involving 12 28-52 yr old experienced scientists and professionals. Findings indicate that the personal narratives were a useful technique for studying personality: the narratives were consistent with the personality assessments derived from the independent interviews and observations and reflected various personal defenses, reflections, and insights that might have been missed in the clinical assessment alone. Analyses of 3 subjects by the commentator, clinical interviewer, and field observer are included.

H-34908
Palinkas, L.A., **Health and performance of antarctic winter-over personnel: a follow-up study,** *Aviation, space and environmental medicine,* Oct. 1986 57(10, section 1), p.954-959, For another version see 15H-33565. 27 refs.

The medical and service history records of enlisted Navy personnel who applied to the Operation Deep Freeze Program between 1963 and 1973 were examined to determine if incidence rates and performance criteria were significantly different between a group of winter-over personnel and a control group of enlisted personnel who were rated as acceptable by a screening team but who did not winter over. Results indicated that the overall incidence rate for the winter-over group was significantly lower than the rate for the control group. The winter-over group also had significantly fewer first hospitalizations for neoplasms, endocrine, nutritional and metabolic disorders, and diseases of the musculoskeletal system. No differences between the two groups were observed on any of the performance indices. Results suggest that wintering over in an extreme and isolated environment does not adversely affect subsequent health and performance of enlisted personnel. (Auth.)

H-34938
Takagi, T., **Longitudinal study on Circadian rhythms of plasma hormone levels during the Japanese Antarctic Research Expedition,** *Hokkaido igaku zasshi,* Jan. 1986 61(1), p.121-133, In Japanese with English summary. 28 refs.

Circadian rhythms of plasma cortisol, aldosterone and testosterone levels in man were studied longitudinally in Antarctica and in Hokkaido, Japan, over the period of 1 year. Results for Antarctica were as follows: Plasma cortisol, aldosterone and testosterone levels showed average patterns of rhythmicity which were similar to respective Aschoff's standard curves; monthly mean plasma cortisol level diminished markedly in June, the month of darkness throughout the day, but normal circadian rhythm of cortisol level was maintained even during this period; monthly mean plasma aldosterone level increased markedly in July, dark winter month, and also in Dec., the month of midnight sun in Antarctica; monthly mean plasma testosterone level increased markedly in June, the month of darkness in Antarctica. Corresponding findings for Hokkaido are also given. The findings suggest that social factors rather than light-dark cycle act as a Zeitgeber effective for the maintenance of circadian rhythms of human circulating hormone levels. (Auth.)

H-35009
Parkinson, A.J., Scott, E.N., Muchmore, H.G., **Comparison of a solid-phase enzyme immunoassay and a radioimmunoassay using a double-labeled (enzyme-125) antibody,** *Journal of clinical laboratory automation,* 1982 2(3), p.177-182, 17 refs.

The use of aliquots of antihuman IgG labeled with alkaline phosphatase allowed direct comparison between solid-phase enzyme immunoassay (EIA) and radioimmunoassay (RIA) using the same antibody and identical assay conditions. Details are given of the results of direct and indirect assays. Part of the study was performed in connection with the U.S. Antarctic Program. (Auth. mod.)

H-35011
Parkinson, A.J., Scott, E.N., Muchmore, H.G., **Identification of parainfluenza virus serotypes by indirect solid-phase enzyme immunoassay,** *Journal of clinical microbiology,* Mar. 1982 15(3), p.538-541, 3 refs.

An indirect enzyme immunoassay was used to detect and identify parainfluenza virus serotypes 1 and 3 in cell culture residuals from which infectious virus could no longer be recovered. Parainfluenza virus types 1 and 3 were recovered from adult subjects during the austral summer and the winter isolation period at the South Pole Station during 1978. (Auth. mod.)

H-35014
Brotherhood, J.R., **Physical characteristics of the members during the International Biomedical Expedition to the Antarctic,** *European journal of applied physiology,* 1986 55(5), p.517-523, Refs. p.522-523.

Twelve male medical scientists formed the International Biomedical Expedition to the Antarctic (IBEA). Their physical characteristics and maximum oxygen uptakes (VO2 max) were measured in association with 3 series of thermal tolerance tests in Sydney, twice before and once after going to the Antarctic. In the Antarctic they lived in tents and spent 15 days travelling by motor toboggan. Their

body mass (BM) and skinfold thickness (SFT) were measured 4 times during the 69 days the expedition spent in the field. In the Antarctic 9 men lost between 0.7 and 5.5 kg (mean 2.7 kg) of BM and a decrease in SFT, whilst 2 men increased BM by 1.2 and 1.9 kg without change in SFT. One man retired early from the expedition. Bm and SFT were regained and physical fitness lost during the return voyage to Australia. Consequently there was no difference in average SFT between the pre- and post-Antarctic laboratory tests, but BM was greater after the Antarctic implying gains in fat free mass. VO2 max was lower in the final laboratory tests than in the tests before Antarctica. (Auth. mod.)

H-35015

Budd, G.M., Hendrie, A.L., Jeffery, S.E., **Behavioural temperature regulation during a motor-toboggan traverse in Antarctica,** *European journal of applied physiology,* 1986 55(5), p.507-516, 33 refs.

Ten men, members of the International Biomedical Expedition to the Antarctic (IBEA), regularly recorded their thermal comfort, clothing, and activity for 60 days while travelling by motor toboggan and living in tents on the Antarctic plateau. Air temperature averaged -14 C (range +2 to -29 C) and wind speed 11 m/s. Daily (24h) energy expenditure averaged 14.6 MJ on travelling days, 12.7 MJ on days when men worked in camp, and 13.3 MJ for the whole traverse. Men were outdoors for 7.6 h of the 12 h sampling period on travel days and for 3.6 h on camp days. Bulky down-filled clothing, typical of that used by present-day polar expeditions, adequately protected the trunk from cold at the cost of overheating during exercise. Face, hands, and feet were less well protected. The results suggest that there is a need for improvements in clothing design which will permit a more complete adjustment to changes in activity. The residual cold stress might possibly have been enough to induce cold acclimatization, although the accompanying heat stress was probably insufficient to induce acclimatization to heat. (Auth. mod.)

H-35016

Williams, D.L., Climie, A., Muller, H.K., Lugg, D.J., **Cell-mediated immunity in healthy adults in Antarctica and the sub-Antarctic,** *Journal of clinical and laboratory immunology,* 1986 20(1), p.43-49, 15 refs.

Cell-mediated immune responses were studied in 2 antarctic and sub-antarctic groups at quarterly intervals over a wintering year, using the cutaneous CMI Multitest. The sub-antarctic population at Macquarie I. had levels of responsiveness and hypoergy comparable to other healthy populations in temperate regions. The antarctic group at Mawson showed decreased scores and total number of positive responses to antigens, and a significantly elevated incidence of anergy and hypoergy. Quarterly skin testing showed considerable variability in subject responsiveness to specific antigens at different times over the year. However, only 2 antigens at Macquarie I., trichophyton and proteus, showed a significant seasonal variation in score. There was no statistically significant seasonal variation in antigen scores at Mawson. It is concluded that environment and stress factors in antarctic expeditions are responsible for the decreased immunological responsiveness. (Auth.)

H-35017

Reed, H.L., Burman, K.D., Shakir, K.M.M., O'Brian, J.T., **Alternations in the hypothalamic-pituitary-thyroid axis after prolonged residence in Antarctica,** *Clinical endocrinology,* 1986 25(1), p.55-65, Refs. p.63-65.

The response of the hypothalamic-pituitary-thyroid axis was studied in 17 euthyroid men before, during and after assignment to duty in the Antarctic. Serum total and free T4 levels fell slightly but not significantly after very prolonged Antarctic residence. Serum total and free T3 decreased significantly from basal levels of 170 ng/dl and 388 pg/dl to 155 ng/dl and 319 pg/dl respectively after Antarctic duty. Serum T3 levels increased after 42 weeks of polar living, the end of the observation period, but the change did not attain statistical significance. The daily circadian rhythm of serum cortisol was maintained throughout the study period. The alterations in thyroid hormones which are described, are apparently related to the chronic cold exposure which the subjects experienced in this polar environment. (Auth. mod.)

H-35050

King, H., **Epidemiology in Antarctica?,** *Journal of epidemiology and community health,* 1986 Vol.40, p.351-356, 12 refs.

From the perspective of the potential for a growing human social system in Antarctica, the scope for epidemiology to contribute to polar medicine, or to polar public health, is being considered. Features of antarctic communities that might be exploited in epidemiological investigations of a more general nature are discussed. These opportunities are weighed against the limitations that certain features of antarctic society will inevitably place upon epidemiological research. A brief description of the physical, historical, and political background to man's presence in Antarctica is given in order to place past, present, and future activities there in context.

H-35067

Krikler, S.J., ***Staphylococcus aureus* in Antarctica: carriage and attempted eradication,** *Journal of hygiene,* Dec. 1986 97(3), p.427-444, Refs. p.443-444.

The carriage of *Staphylococcus aureus* was studied in a group of 28 men living in a totally isolated environment for a year. Initially, nasal, axillary and perineal swabs were taken at weekly intervals, but from week 24 throat swabs were taken from known nasal carriers. Several attempts were made during the study to eradicate *S. aureus.* Eight subjects consistently carried their own phage type throughout the study, despite the application of antibacterial agents. In three subjects strains were isolated late in the study of a phage type which had either not been isolated before in this study, or had not been found for a prolonged period. Nine of the 12 nasal carriers also yielded *S. aureus* from the throat. It is apparent that following attempted eradication, *S. aureus* may seem to disappear, only to reappear some time later; 'eradication' in this case would be an erroneous appellation. (Auth.)

H-35085

Matusov, A.L., Riabinin, I.F., Biziuk, A.P., Shepoval'nikov, V.N., **Nervous disorders in Soviet wintering-over personnel** [Nevrozy i nevroticheskie rasstroĭstva u uchastnikov sovetskikh antarkticheskikh ekspeditsiĭ], *Antarktika; doklady komissii,* 1984 No.23, p.155-164, In Russian. 36 refs.

DLC G576.A65

Ten years of data on the distribution, etiology and clinical aspects of nervous disorders in Soviet personnel wintering in Antarctica are analyzed. The role of natural, psycho-sociological and personality factors conducive to such disorders is evaluated. It is concluded that methods to combat factors unique to the antarctic environment—the social isolation, monotony, prolonged sensory deprivation, etc.—should be investigated to decrease the probability of the occurrence of neuro-psychic disorders.

H-35086

Deriapa, N.R., Davidenko, V.I., **Adaptation of cardiovascular system in man to antarctic conditions** [Adaptatsionnye reaktsii sistemy krovoobrashcheniia u cheloveka v usloviiakh Antarktidy], *Antarktika; doklady komissii,* 1984 No.23, p.165-175, In Russian. Refs. p.174-175.

DLC G576.A65

On the basis of data obtained by the authors, and analysis of pertinent literature, the development of various physiological and pathological changes during man's adaptation to antarctic conditions is reported. Adaptation values are shown on different levels of stability in relation to the complex ecological factors in Antarctica and in the face of different chemo-dynamic types (variations of self-regulation of the cardiovascular system). The functional parameters of the latter are presented.

H-35323

Cosman, B.C., Brandt-Rauf, P.W., **Infectious disease in Antarctica and its relation to aerospace medicine: a review,** *Aviation space and environmental medicine,* Feb. 1987 58(2), p.174-179, 53 refs.

This review presents a summary of the information on the infectious and immunologic aspects of isolation derived over the years from research in Antarctica.

H-35442

Sullivan, P.G., **Accidental hypothermia and frost-bite in Antarctica,** *Medical journal of Australia,* Feb. 2, 1987 Vol.146, p.155-158, 28 refs.

Two members of an Australian antarctic expedition suffered hypothermia and frost-bite when they were stranded onshore after their small boat was swamped. Their efforts at field survival until recovery, six hours later, are described. At rescue one patient was found to have frost-bite and a core temperature of 30 C. He was treated successfully by rapid rewarming in a hot bath. The other victim was considerably less hypothermic and suffered only mild frost-bite. Contrary to expectations the tall thin patient fared much better than the shorter heavier one. Possible explanations for this difference are discussed. (Auth.)

H-35453

Dick, A.F., **Study of the health and physiological adaptation of an expedition in Antarctica, with special reference to occupational factors,** *Australian National Antarctic Research Expedition. ANARE research notes,* Jan. 1987 No.40, 72p., Refs. p.67-72.

Aspects of man's adaptation and reaction to working in an isolated, cold environment are examined. The health of the Davis 1982 expedition was generally good, with 6.2 cases per wintering expeditioner. Forty-five per cent of cases were the result of accidents. Subject and occupational influences on morbidity are discussed. The results of monthly measurements of nine physiological parameters are reported and compared with the findings from two previous Australian expeditions. The fitness of the expedition, calculated using a submaximal work technique, increased as a linear function over the year, including the winter period. Measurements of temperature changes in divers showed that current practices result in only small falls in body temperature and are unlikely to lead to hypothermia. (Auth. mod.)

H-35484

Smith, E., **Winter in Antarctica: health despite discomfort,** *Psychology today,* Mar. 1987 p.60-61.

An explication is given of a theory of L.A. Palinkas regarding the effects of a 6-8 months duty tour by Naval personnel at Amundsen-Scott Station. Palinkas points out several positive health and performance aspects among those who wintered there compared to those who had been found suitable for antarctic isolated duty but who were not selected to winter over. For the Palinkas article see H-34908.

H-35570

Shult, P.A., Polyak, F., Dick, E.C., **Mild outbreak of adenovirus type-21-caused respiratory illness at McMurdo Station, 1977,** *Antarctic journal of the United States,* 1985 20(5), p.261-262, 7 refs.

During a study of respiratory virus disease etiology and transmission conducted in seasoned naval personnel and civilians stationed at McMurdo Station during the 1977 winter fly-in period, an outbreak of adenovirus type-21 (Ad-21) infection was observed in an isolated population made up of wintering personnel emerging from 6 months' isolation and summer personnel, newly arrived. The summer group allowed the examination, with a single virus, of the widely held belief that persons in polar communities emerging from isolation have enhanced susceptibility to and greater severity of respiratory disease when compared with persons not previously isolated. Details of the methods used are given and the course of the infection is traced. It is concluded that antarctic isolation does not increase susceptibility to respiratory diseases compared to persons in normal communities.

H-35649

Shimaoka, K., **Daily physical activity estimated from heart rate during wintering in Antarctica,** *Tokai annual report of health and physical education,* Dec. 2, 1984 Vol.6, p.47-54, In Japanese with English summary. 14 refs.

The heart rate of a member was recorded during his various daily activities at Showa Station. The mean heart rate of typical days in winter ranged from 73.5 beats/min to 73.6 beats/min, and mean energy expenditure, from 110.1 kcal/hour to 119.0 kcal/hour. In the summer, the mean heart rate was from 87.6 beats/min to 94.8 beats/min, and mean energy expenditure, from 186.4 kcal/hour to 227.2 kcal/hour. During traverse by snowmobile, the mean heart rate was from 85.4 beats/min to 92.4 beats/min, and mean expenditure, 176.5 kcal/hour to 212.1 kcal/hour. The mean heart rate and energy expenditure of a day at Mizuho Station was 89.8 beats/min and 198.5 kcal/hour, respectively. The most distinctive feature about daily physical activities at Showa Station was that the daily energy expenditure was much lower in winter than in summer, and it might be concluded that the difference in daily physical activities between summer and winter affects health conditions and physical fitness of wintering members. (Auth. mod.)

H-35709

Falckh, R.C.F., **Death of Petty Officer Evans,** *Polar record,* Jan. 1987 23(145), p.397-403, 13 refs.

Petty Officer Evans was the first member of Captain Scott's party to die during the return journey from the South Pole in Jan.-Mar. 1912. His death has been ascribed to a combination of scurvy and exhaustion. This paper re-examines the evidence provided by Scott's and Wilson's diaries, and concludes that the primary cause of his death was anthrax, contracted from contact with the expedition ponies or their equipment. (Auth.)

H-35775

Duncan, R., **Proteinuria in polar travellers,** *Polar record,* May 1987 23(146), p.591-593, 9 refs.

During a study of energy balance at the Rothera Station, the incidence of proteinuria (the occurrence of measurable protein in the urine) of dog sledgers and skidoo drivers was investigated. Men on four dog sledge trips and four skidoo trips of mean duration 12 days, and on two long skidoo trips of 56 and 74 days, tested their urine for proteinuria morning and night by 'Multistix' (Ames) test strips. Each subject produced on average one positive urine test approximately every three days. All subjects had proteinuria on at least one occasion. In total, 15 subjects in 562 man-days of travel recorded 178 out of 1124 samples (15.8%) positive for protein. On short trips, all the positive tests occurred either on days when the party travelled, or on days following travel. On the long trips distribution of positive tests

seemed random. More tests were positive in the evenings (60.1%) than in the mornings. Causes of proteinuria not associated with disease include fever, hyperthermia, altitude, and cold exposure. Postural proteinuria has been associated with activity involving extreme lumbar lordosis (bending backward), or it might be due to either minor renal trauma or to kinking of the renal arteries, causing minor impairment of the blood supply to the kidney. Skidoo drivers sit hunched and are subject to much buffeting from uneven surfaces. This might easily cause such minor renal trauma.

H-35852

Bell, J., Garthwaite, P.H., **Psychological effects of service in British Antarctica: a study using the General Health Questionnaire,** *British journal of psychiatry,* Feb. 1987 Vol.150, p.213-218, 19 refs.

This study follows the psychological profile of a group of antarctic explorers on a remote base in British Antarctica. Each month for 1 year the 6-item General Health Questionnaire (GHQ) was administered to the 12-man complement and the results were compared to those of a control group. Three men resigned and left, 4 months later, at the end of winter. Their scoring showed marked differences from the others, including the highest scores in the severe depression factor scale. The GHQ was accepted by the men despite the intrusive threat it offered in such a small community; there was also a seasonal variation in scoring, with higher scores in the winter, and no evidence of long-term psychological sequelae in those who stayed. (Auth.)

H-36021

Palinkas, L.A., Stern, M.J., Holbrook, T.L., **Longitudinal study of personality and disease incidence among antarctic winter-over volunteers,** *U.S. Naval Health Research Center. Report,* Sep. 1986 No.86-25, 16p., ADA-178 429, Refs. p.14-16.

This study examined the relationship between certain personality characteristics and the long term risk for disease incidence. Subjects were 2,724 enlisted Navy men who volunteered to winter-over in Antarctica between 1963 and 1974. Men who actually wintered-over were compared with a control group of personnel found to be acceptable for winter-over duty but assigned elsewhere. Results indicated that age was positively correlated with increased disease risk while education and the personality measures of Control-Expressed and Achievement need were negatively correlated. Those who did not winter-over in Antarctica had a significantly higher independent risk for subsequent disease incidence than the winter-over group. (Auth. mod.)

H-36022

Palinkas, L.A., **Long-term effects of environment on health and performance of antarctic winter-over personnel,** *U.S. Naval Health Research Center. Report,* Dec. 1985 No.85-48, 11p., ADA-165 982, Refs. p.10-11.

The object of this study was to determine if the risk to health well-being of personnel who winter-over in Antarctica is related to the station to which they are assigned. Subjects were 327 enlisted Navy personnel who wintered over between 1963 and 1974. A fifteen-year period from 1965 to 1979 was established for follow-up. Results indicated that there was no relationship between rates of first hospitalization and severity of station environment. No significant differences were observed on any of the performance indicators in comparisons between stations or by station size and severity of environment. Environment, therefore, appears to have no adverse long-term effect on health and performance. (Auth. mod.)

H-36023

Palinkas, L.A., **Sociocultural influences on psychosocial adjustment in Antarctica,** *U.S. Naval Health Research Center. Report,* Dec. 1985 No.85-49, 17p., ADA-165 988, Refs. p.15-17.

Psychological stress is a "normal" part of wintering-over in the Antarctic, given the unusual living conditions of small groups, the harsh environment, and the prolonged isolation from outside contact. The degree of stress, however, is influenced by different sociocultural factors. Three in particular are examiend in this paper: those located in the individual personality; those located in the sociocultural backgrounds of station personnel; and those located in the sociocultural systems of the stations themselves. Certain conflicts emerge from the interaction of these influences. The process of social comparison which fosters group homogeneity also generates perceptions of relative control over the social environment and self-esteem. Those people who perceive themselves to be powerless or helpless because they cannot exercise autonomy in either a social or a psychological sense have the greatest difficulty in adjusting to the antarctic environment. Resources enabling one to deal with similar isolation may be viewed as adaptive in this particular environment. (Auth. mod.)

H-36181

Buguet, A., Rivolier, J., Jouvet, M., **Human sleep patterns in Antarctica,** *Sleep,* 1987 10(4), p.374-382, 24 refs.

Eight volunteers wintering in the French coastal station Dumont d'Urville underwent 156 polysomnographic night recordings. The subjects, selected for their usual good sleeping habits, were recorded on 17-21 nights throughout the wintering in sessions of 2 to 3 consecutive nights. A two-way analysis of variance showed that most of the subjects' sleep characteristics were not similar, leading the authors to study the individual time course of sleep variables. In all subjects, delta sleep tended to increase throughout the wintering, whereas stages 1 and 2 decreased. No significant variation was seen in paradoxical sleep (PS), neither between subjects nor with time. PS latency was also within normal range, but it was bimodally distributed in subjects S1, S2 and S8. Some other sleep variables also varied in certain subjects. Such was the case for sleeping time, which decreased throughout the wintering period in subject S8, the least adapted individual. (Auth. mod.)

H-36201

Matusov, A.L., **Morbidity in wintering expedition personnel** [O zabolevaemosti uchastnikov zimovochnogo sostava ekspeditsii], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.81, p.101-109, In Russian.

Statistics are discussed and tabulated data are presented showing a 9.7% occurrence of various diseases in personnel of the 24th Soviet Antarctic Expedition, and 11.4% in the 23rd. It is suggested that winter conditions greatly aggravate chronic diseases, the majority of cases involving respiratory disorders.

H-36235

Belkin, V.Sh., Astakhov, O.B., Akhmedov, N.Kh., **Transportation of small experimental animals to Antarctica for medical research** [Opyt transportirovki melkikh eksperimental'nykh zhivotnykh v Antarktidu dlia nauchnykh meditsinskikh issledovanii], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.80, p.145-152, In Russian.

The question of transporting albino rats to Antarctica, and housing them at the stations, is discussed. Recommendations are made with regard to the isolation of the animals on board ship or helicopter, their feeding and drinking time and rations, the type of cage and

vivarium needed on board ship or on vehicle for land transportation (illustrations included), and the general care of the animals' comfort, hygiene and health.

H-36317

Palinkas, L.A., **Antarctica as a model for the human exploration of Mars,** *U.S. Naval Health Research Center. Report,* July 19, 1987 No.87-16, 21p., 46 refs.

Among the many issues to be addressed in planning for the eventual human exploration of Mars are the processes of social adaptation and psychological adjustment to prolonged isolation in an extreme environment. The human experience of exploration and research in Antarctica can contribute much to this understanding. This paper provides a brief historical overview of the experience of social adaptation and psychological adjustment of Antarctic expeditions. Factors which currently influence these processes in the Antarctic, including social organization, "Antarctic culture," social and psychological resources used for coping with stress, and environmental resources and constraints, are examined. The paper also describes the effect of these processes on the health and performance of Antarctic winter-over personnel. The relevance of the Antarctic experience to planning for extended missions on Mars is discussed. (Auth.)

H-36389

Bartolomé, J.A., **Medical considerations after the First Spanish Scientific and Fishing Expedition to Antarctica** [Consideraciones médicas tras la primera expedición científico-pesquera española a la Antártida], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.399-406, In Spanish with English summary.

Based on the field work of the medical officers of the First Spanish Scientific and Fishing Expedition to the Antarctic, this paper analyzes the health and safety aspects of the expedition and establishes the basic principles to be applied to future maritime expeditions to antarctic areas or other places with similar characteristics. (Auth.)

H-36413

Arendt, J., Broadway, J., **Light and melatonin as zeitgebers in man,** *Chronobiology international,* 1987 4(2), p.273-282, 56 refs.

The light-dark cycle is the major zeitgeber (synchronizer) for both circadian and seasonal rhythms in most species. In man, its importance was underestimated until recently. A new impetus was given to investigations of the influence of the light-dark cycle, and of photoperiod length on human physiology by findings that demonstrated the light-mediated control of melatonin secretion from the human pineal gland, and in particular the relative efficiency of bright (>2500 lux), as compared to dim (<500 lux) light. It has recently been shown that in normal subjects human melatonin production, at night, could only be suppressed by light intensities exceeding 2500 lux. This observation has far-reaching implications for circadian physiologists, medicine (in particular psychiatry and aerospace medicine), industry and the military. Background and research in the last few years on these topics are reviewed and effects on antarctic personnel are considered. (Auth. mod.)

H-36414

Broadway, J., Arendt, J., Folkard, S., **Bright light phase shifts the human melatonin rhythm during the antarctic winter,** *Neuroscience letters,* 1987 Vol.79, p.185-189, 21 refs.

In most species daily and seasonal changes in the light-dark cycle are the most important synchronizers (zeitgebers) of daily and seasonal rhythms. In humans only bright light (2500 lux) appears to be an effectivc circadian zeitgeber. Seasonal effects of light on human physiology have not been investigated. The low intensity illumination of the antarctic winter is used to investigate the effects of bright- or dim-light treatment for an hour in the morning and in the evening (a 'skeleton' 12.5-h day) for 6 weeks on the plasma melatonin rhythm, together with mood and a number of behavioral variables. In parallel seasonal changes in melatonin were observed. Melatonin is known to convey daylength information in photoperiodic seasonal breeders through characteristics of its night-time secretion profile. Bright-, but not dim-, light treatment in winter induced a marked phase advance of the melatonin rhythm, similar to that found in the summer, without marked effect on the other variables. Thus at least one human seasonal change appears to be light-dependent. (Auth.)

H-36488

De Freitas, C.R., Symon, L.V., **Bioclimatic index of human survival times in the Antarctic,** *Polar record,* Sep. 1987 23(147), p.651-659, 30 refs.

An index of human 'survival time outdoors in extreme cold' (STOEC) has been developed, using body-atmosphere energy budget modelling procedures. The index, which is applicable in places like Antarctica where only limited climatological data are available, is based on the calculated rate of fall of core temperature from 37 C to 27 C of a standard inactive healthy subject in full polar clothing. Applied to data from 12 antarctic stations it indicates relative severity of their mean and extreme climatic conditions. The severest winter conditions become life-threatening after only about 20 minutes. At most stations in winter, exposure outdoors for more than two hours would be dangerous. Conditions at all coastal stations in summer are mild enough to allow a normal core temperature to be maintained. The index has many applications, for example estimating likely survival times of immobilized accident victims and guidelines for duration of work periods outside. (Auth.)

H-36490

Taylor, A.J.W., McCormick, I.A., **Reactions of family partners of antarctic expeditioners,** *Polar record,* Sep. 1987 23(147), p.691-700, 9 refs.

This study breaks new ground by involving the partners of antarctic expeditioners as well as the expeditioners themselves in one aspect of a comprehensive research program on stress. It reports the reactions of both parties before, during and after their separation. It shows that there were discrepancies between the partners about the sufficiency of prior discussion, the possibility of injury or death arising with the expeditioners on their hazardous venture, and about the ability of partners to cope at home. A follow up of the couples 16 months after the separation showed that their marital relationships in general had improved slightly, although there were some individual exceptions. The study emphasized the importance of including partners as well as the specific subjects themselves in future medical and behavioral research; future studies might usefully extend beyond the couples to include all relevant family members.

H-36492

King, H., **New health register for Australian National Antarctic Research Expeditions,** *Polar record,* Sep. 1987 23(147), p.719-720, 4 refs.

The aims of the ANARE Health Register are to quantify the occurrence of ill health in antarctic personnel, to compare incidence rates with those of the domestic population, to assess temporal, seasonal and occupational trends, and to identify high-risk groups. At present descriptive, the project will in time provide a data base for generating and testing hypotheses, and for assessing the value of future public health measures. Data are collected in three stages which are described as to what information is collected at which stages and how the data are used and by whom. (Auth. mod.)

H-36493

Lugg, D., Gormley, P., King, H., **Accidents on Australian antarctic expeditions,** *Polar record,* Sep. 1987 23(147), p.720-725, 9 refs.

During the period of analysis Australian expeditioners experienced 1301 injury occurrences, of which 1205 (92.6%) are classed as minor trauma, 39 (3.0%) major trauma, and 57 (4.4%) environmental. Overall, this amounts to about one injury/expeditioner/year. It is estimated that annual alcohol consumption among ANARE personnel amounts to 16.3 liters/head. Alcohol is implicated in about 7% of all accidents over the period.

H-36516

Varela de Rodriguez, J., **Alteration of circadian variation of prolactin and adrenal steroids in response to cold stress** [Alteración de la variación circadiana de prolactina y esteroides adrenales en respuesta al estrés de frío], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.329, 12p., In Spanish with English, French and German summaries. 17 refs.

Studies carried out on cortisol (F), aldosterone (AL) and prolactin (PRL), obtained in individuals before and after being submitted to low temperatures, are reported. Three volunteers, members of the scientific personnel at Brown Station, were exposed to temperatures varying between -4 and -11 C, during a period of uninterrupted 8 hours, starting at 8AM. Blood, F, Al and PRL levels were determined. Statistical comparison was made between the values obtained at 8AM, 4PM and at midnight, (basal and stress). Cortisol, prolactin and the aldosterone showed circadian variation in basal conditions. During stress, the cortisol and the prolactin altered their profile at 4PM, recovering it later, at midnight. The aldosterone did not alter the circadian variation during stress. The findings suggest that exposure to cold during 8 hours results in the alteration of the circadian rhythm only from the specific hormones of stress, cortisol and prolactin. (Auth. mod.)

H-36521

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic first aid manual,** Christchurch, 1986, 52p.

In twenty-two sections advice is given for initial treatment of a wide variety of ailments including, among others, accidents, EAR/CPR, bleeding and wounds, shock, cold injuries, burns, fractures, sprains, poison, wind chill, and eye and skin injuries. Discussed also are dental health, medication, injection, and various medical kits assembled for antarctic conditions.

H-36554

Terelak, J., **Dynamics of simple arithmetic task performance under antarctic isolation,** *Polish psychological bulletin,* 1985 16(2), p.123-128, 16 refs.

Data collected by numerous investigators suggest that one of the most important symptoms of the 'wintering-over syndrome' in Antarctica is a decrease in mental capacity, mainly sluggish thinking, inertia, disturbances in memory and attention. These deficits increase proportionally to the duration of antarctic isolation. One-hour Kraepelin test was applied, with 3 min. work segments marked, every second month, six times in a year, to Arctowski Station personnel. A number of indices of general mental efficiency, mental capacity, emotional resistance, and mental reliability were analyzed. Several significant findings emerged: gradual changes in the structure of mental work controlled over 2-month intervals; a relative increase in mental capacity in the initial segments of the 1-hour work and a simultaneous decrease in the final segments. The effect of emotion on the mental work curve was not significant. (Auth. mod.)

H-36598

Takizawa, Y., **Some possible ultraviolet effects on the incidence of skin cancer among Japanese due to modification of the ozone layer,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.59-68, 13 refs.

An epidemiological analysis was conducted in order to examine possible ultraviolet effects on the incidence of skin cancer among Japanese. Age-adjusted mortality rates (AMRs) and standardized mortality ratios (SMRs) from 1971 to 1977, ratios of cumulative mortality rates (CMRs) from 1950 to 1960 and from 1960 to 1970, and the number of patients from 1975 to 1980 were obtained for skin cancer and malignant melanoma from vital statistics of Japan. The results indicated that the AMRs of skin cancer and melanoma were much lower than those observed in other countries, and have remained almost unchanged over a long period of time. The SMRs showed a significant correlation with climatological variables, such as latitude and temperature, and socioeconomic income class. However, no significant association was found between the SMRs and the duration of sunshine available. When comparing incidences of the diseases of Japanese with those of Australian and northern Europeans, it seems evident that genetic susceptibility linked to skin color may be a determinant factor for skin cancer. (Auth.)

H-36738

Nabuco de Moraes, G., **Human behavior in Antarctica** [Comportamento humano na região Antártica], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* July 1987 No.11, p.10, In Portuguese. 7 refs.

From a questionnaire completed by wintering-over personnel in Antarctica, regarding stress connected with their environment, the following are identified as the factors of most concern: the icy, almost constant wind; changes in biocycles, especially due to light intensity; the silence; anxiety for news from outside; confinement to quarters during long storms; and insomnia.

H-36947

Shepoval'nikov, V.N., Biziuk, A.P., Shatilo, A.I., **Adaptation changes of the cardiovascular system in antarctic explorers** [Adaptatsionnye i dizaptatsionnye izmeneniia deiatel'nosti serdechnososudistoĭ sistemy u poliarnikov v Antarktide], *Antarktika; doklady komissii,* 1987 No.26, p.179-185, In Russian. 24 refs.

Analysis of clinical histories in wintering-over personnel at Soviet stations between 1956 and 1982 shows an incidence of 4.1% of general disorders of which 2.4% are cardiovascular system disorders (CSD). Various types of CSD are described and the percentages of their occurrence during the period investigated are given.

H-36948

Bobrov, L.L., Klopov, V.P., Marchenko, A.M., IAkovlev, V.A., **Seasonal dynamics of blood circulation indices of antarctic explorers** [Sezonnaia dinamika pokazateleĭ krovoobrashcheniia u poliarnikov v Antarktide], *Antarktika; doklady komissii,* 1987 No.26, p.186-190, In Russian. 12 refs.

Complex data on hemodynamics in participants of 3 antarctic expeditions, directed toward the study of acclimatization processes, are analyzed. Alteration of all cardiac functions is found. A distinct seasonal nature of ECG indicators, and their correlation to the acclimatization process, is shown. The diagnostic and prognostic value of the study of hemodynamics in man, in antarctic conditions, is emphasized.

H-36995
Palinkas, L.A., **Longitudinal study of disease incidence among antarctic winter-over personnel,** *Aviation, space, and environmental medicine,* Nov. 1987 58(11), p.1062-1065, 15 refs.

A longitudinal perspective was employed to test the hypothesis that there is an increased risk of hospitalization among antarctic winter-over personnel during the first year subsequent to his duty. Subjects were 327 enlisted Navy men who wintered-over between 1963 and 1974 and a control group of 2,396 enlisted men who volunteered and were accepted for winter-over duty but who did not winter-over. A 15-year period from 1965 to 1979 was established for follow-up. Follow-up of subjects subsequent to screening for Operation Deep Freeze was conducted in 6-month intervals for the first 4 years. Results indicated that the total rates of first hospitalization during the 6 months prior to antarctic duty and the first 6 months in Antarctica among winter-over personnel were significantly lower than the rates for the control group. No significant difference in the rates of the two groups was observed for the 12 months subsequent to winter-over duty. (Auth.)

H-36997
Stroud, M., **Physiological report,** Walk to the Pole: to the heart of Antarctica in the footsteps of Scott, by R. Mear and R. Swan with research and additional material by L. Fulcher, New York, Crown, 1987, p.285-291.

Data from investigations of the mechanisms of human body weight control and metabolic adaptation to cold, in 5 participants of the "In the footsteps of Scott" expedition to the South Pole, are discussed. The comparative analysis of diet, energy balance during the polar journey on foot, and results of physiological tests are presented.

H-37004
Aĭdaraliev, A.A., Maksimov, A.L., **Adaptation and its prognosis in people with different levels of hypoxic stability at high altitudes of Antarctica** [Adaptatsionnaia i prognosticheskaia kharakteristika lits s razlichnym urovnem gipoksicheskoĭ ustoĭchivosti v usloviiakh vysokogor'ia Antarktidy], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1984 Vol.79, p.119-124, In Russian. 9 refs.

Comparative studies of human adaptation to high altitudes were carried out in central Asia and central Antarctica. Results show that the length of the critical phase of adaptation to conditions does not depend on the severity and nature of the stress agent; the duration of the transition period does.

H-37019
International Symposium on Circumpolar Health, 6th, Anchorage, Alaska, May 13-18, 1984, Fortuine, R., ed, **Proceedings. Circumpolar health 84,** Seattle, University of Washington, 1985, 484p., Refs. passim. For selected papers see H-37020 through H-37022.

DLC RC955.2.I57

This is a collection of papers and addresses presented at the 6th International Symposium on Circumpolar Health, held in Anchorage, Alaska, May 13-18, 1984, by scientists, administrators and health workers assembled from 21 countries. The papers have been arranged by subject matter. Three are pertinent to Antarctica, 2 of which deal with the physiology and pathology of cold climates, and 1 with health programs and manpower.

H-37020
Hurst, G.L., **Physical fitness and training programs on an antarctic base,** Circumpolar health 84. Proceedings of the 6th International Symposium on Circumpolar Health, edited by R. Fortuine, Seattle, University of Washington, 1985, p.49-52, 9 refs.

DLC RC955.2.I57

The aims of this study were to investigate the effects on various physiological parameters of a year of life on an antarctic base. During the austral winter of 1982 the Faraday Station complement comprised 10 men: 6 scientists and 4 support staff. All base members took part in the study, which involved having measurements taken each month for a whole year. The main conclusions drawn were: the habitual energy expenditure was low compared with previous studies on a British antarctic base; the percentage time outside was low for all except the few months of the short summer; physical fitness was greater than might be expected, being higher than that found at another BAS base and among a cross section of British army recruits; only the group undertaking a program of isometric training achieved any physiological response. This was considered due to the greater motivation required for continuation of the cycling program.

H-37021
Bridgman, S.A., **Acclimatization to cold in antarctic scuba divers,** Circumpolar health 84. Proceedings of the 6th International Symposium on Circumpolar Health, edited by R. Fortuine, Seattle, University of Washington, 1985, p.53-57, 10 refs.

DLC RC955.2.I57

The aim of this study was to investigate the theory that the divers at Signy acclimatize to cold. Nine of the 13 men who overwintered at Signy Station in 1982 participated in this project. Subjects underwent a monthly cold stress of sitting for one hour, immersed to the neck, in a tank of water at 20C with an estimated velocity of 0.02 m/sec. No evidence of physiological or local acclimatization to cold has been found in the antarctic divers studied.

H-37022
Lugg, D., **Medical recruitment for the Australian National Antarctic Research Expedition,** Circumpolar health 84. Proceedings of the 6th International Symposium on Circumpolar Health, edited by R. Fortuine, Seattle, University of Washington, 1985, p.398-401, 3 refs.

DLC RC955.2.I57

As research initiatives by Australia and a multi-million dollar rebuilding program have been in jeopardy due to lack of medical support, a survey was made of the medical practitioners who have worked on ANARE in the period 1947 to 1984. Data such as age on joining, university of graduation, qualifications, and experience were assessed for changes in the recruitment pattern in an effort to predict the most likely source of recruits in the future. Tabulated data are presented. Factors having negative influence on recruiting for ANARE are listed as follows: availability of doctors with skills to cope with breadth and isolation of practice; conditions of employment; adverse publicity; failure to utilize medical research potential; competition from commercial agencies recruiting for foreign service; lack of medical care for doctors becoming ill; and isolation from families, colleagues and continuing medical education.

H-37049
Nicholas, J.M., **Small groups in orbit: group interaction and crew performance on space station,** *Aviation, space and environmental medicine,* Oct. 1987 58(10), p.1009-1013, 28 refs.

Orbiting space stations raise unprecedented demands on crew performance and group interaction. Previously, antarctic studies re-

vealed evidence of deterioration in social relationships and work effectiveness, particularly during the long winter; a decline was observed in compatibility, group pride, teamwork, and group efficiency, and groups with the greatest decline had the least morale and experienced most difficulty in keeping essential equipment operating. These findings are consistent with reports from Soviet Salyut missions. It is noted that, in spite of these reports, the interpersonal criterion is virtually ignored in the current space station planning. Directions for possible training and team development are suggested.

H-37076

Minnulin, I.P., Bobrov, L.L., Lupacheva, S.I., **Dynamics of some blood indexes of wintering-over personnel** [Dinamika nekotorykh pokazateleĭ krovi u poliarnikov vo vremia zimovkiĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.88-93, In Russian. 3 refs.

Presented and discussed are tables showing the following: indexes of dynamic blood changes in man from Mar. through Dec.; results of comparison of mean values for the beginning, middle and end of winter; biochemical indexes; and blood changes dependent on solar activity. The latter is found to be the most significant factor influencing human physiology in Antarctica.

H-37077

Bobrov, L.L., **Daily and seasonal variations of vector-electrocardiogram in wintering-over personnel** [Sutochnye i sezonnye izmeneniia vektor-elektrokardiogrammy vo vremia antarkticheskoĭ zimovki], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.94-98, In Russian. 3 refs.

Clinical and electrocardiogram studies were carried out on 11 members of the wintering-over personnel at a coastal station during the 26th Soviet Antarctic Expedition. Results, presented in tables, show a distinctly seasonal nature of the VEKG indicators and their correlation to the acclimatization processes, the changes depending on the antarctic light regime. The polar night is found to be detrimental to the functional stability of human heart muscles.

H-37152

Evans, G.W., Stokols, D., Carrera, S., **Human adaptation to isolated and confined environments. Final report, Apr. 1985-July 1987,** *U.S. National Aeronautics and Space Administration. Contractor report,* Dec. 10, 1987 NASA-CR-181502, 141p., N88-12248, Refs. p.85-93.

A study was conducted over 7 months in a winter antarctic isolated and confined environment (ICE). Physiological and psychological data was collected several times a week. Information was collected on a monthly basis on behavior and the use of physical facilities. Adaptation and information indicated that there was a significant decrease in epinephrine and norepinephrine during the middle trimester of the winter. No vital changes were found for blood pressure. Self reports of hostility and anxiety show a linear increase. There were no significant changes in depression during ICE. The physiological and psychological data do not move in a synchronous fashion over time. The data also suggest that both ambient qualities of an ICE and discrete social environmental events, such as the arrival of the summer crew, have an impact on the outcome measures used. It may be most appropriate to develop a model for ICE's that incorporates not only global chronic stressors common to all ICE's but also the role of discrete environmental effects which can minimize or enhance the influence of more chronic stressors. Behavioral adjustment information highlights the importance of developing schedules which balance work and recreational activities. (Auth. mod.)

H-37163

Lugg, D.J., **International co-ordination of antarctic medical research and medicine,** *Arctic medical research,* 1987 46(1), p.29-34, 7 refs.

Although polar human biology was carried out on early antarctic expeditions, it was *ad hoc* and had little continuity or co-ordination. The advent of the Scientific Committee on Antarctic Research (SCAR) and international programs, and co-ordination by subsidiary groups such as the SCAR Working Group on Human Biology and Medicine has had a great impact on these studies as well as on the provision of antarctic health care services. (Auth.)

H-37262

Palinkas, L.A., **Group adaptation and individual adjustment in Antarctica: a summary of recent research,** *U.S. Naval Health Research Center. Final report,* Aug. 13, 1987 NHRC-87-24, 38p., ADA-186 605, Refs. p.32-36.

A series of studies conducted at the Naval Health Research Center examined the health and service records of enlisted Navy personnel who applied to the Operation Deep Freeze program between 1963 and 1974. The objective of these studies was to determine if follow-up incidence rates and performance criteria were significantly different between a group of winter-over personnel and a control group of enlisted personnel who were screened and qualified for winter-over duty but assigned elsewhere. Reults indicate that the overall incidence rate for the winter-over group was significantly lower than the rate for the control group. An increase in total disease incidence was observed among the winter-over group within a year of their return from the Antarctic, but this increase failed to attain statistical significance relative to the rate of the control group. In addition, individuals with high needs for achievement and control over others were found to be at reduced risk for long-term disease incidence. (Auth. mod.)

H-37310

Oakley, E.H.N., **First antarctic winter in tents: The Joint Services Expedition to Brabant Island. Pt.1,** *Royal Naval Medical Service, London. Journal,* Summer 1986 Vol.72, p.69-74, 1 ref.

This, the first part in a series of three, describes the medical aspects of the Joint Services Expedition to Brabant I. The expedition was logistically light and simple, and used tents instead of huts for accommodation. Main achievements included a 140 mile journey in 5 m inflatable boats, the first ascents of 55 peaks, the first complete overwintering in tents, and the 100 mile circumnavigation of the island by canoe. Apart from the well-publicized crevasse fall in which a member of the expedition fractured his femur, medical problems were few and minor. The planning, preparations and problems are described in detail. (Auth.)

H-37311

Oakley, E.H.N., **First antarctic winter in tents: The Joint Services Expedition to Brabant Island. Pt.2,** *Royal Naval Medical Service, London. Journal,* Winter 1986 Vol.72, p.172-178, 7 refs. For Pt.3 see G-37187.

This second article in a series of 3, covers aspects of the physiological research carried out during the Joint Services Expedition to Brabant Island. The major task in this was to investigate fluid balance in the 12 subjects whilst they lived in harsh field conditions through the winter, to see, if any acclimatization occurred. The practical relevance of this to the prevention of cold injury, which is highly likely in those dehydrated by the climate, is discussed. Practical matters to enable such research to be carried out are described, and some of the findings tentatively presented. In particular, it would appear that the subjects did undergo cold dehydration, to be followed after 6

weeks or so by an apparent return to normal. Their cold diuresis appeared not to be the result of nocturnal changes in renal perfusion, but may have a hormonal basis. (Auth.)

H-37485

Oakley, H., **Joint Services Expedition to Brabant Island, Antarctica: overwintering in tents,** *Medical Society of London. Transactions,* 1984-1986 Vol.102, p.59-62.

Observation of a small group overwintering in tents is reported, with a description of preparations for potential medical problems, the planning of logistics, the basis for team selection, and a review of the physiological and pathological changes during the process of acclimatization. The claim that snow-holes should be constructed so that the occupants sleep as high as possible above a cold trench is confirmed, and the claim that the air temperature within a snow-hole never falls below 0 C provided a candle is kept alight is refuted.

See also:
A-36525 B-37200 D-35897 G-35111 I-36545

I. METEOROLOGY

I-34670
Scientific Committee on Antarctic Research. Group of Specialists on Antarctic Climate Research, **Antarctic climate research, No.1,** Kingston, Tasmania, Australia, Sep. 1986, 31p., For selected papers see 41-1072 through 41-1077 or I-34671 through I-34676.

This is the first issue of a Newsletter dedicated to publicizing and promoting research contributing to the study of the role of Antarctica in the global climate system. The theme for the issue is Automatic Weather Stations in Antarctica. Several nations report their activities, either on-going or anticipated in the future, with AWS programs at various places on the continent.

I-34671
Stearns, C.R., **United States Antarctic Research Program automatic weather station project,** *Antarctic climate research,* Sep. 1986 No.1, p.5-12, 16 refs.

The scientific aims of the automatic surface weather station (AWS) project of the United States Antarctic Research Program (USARP) involve the efforts of several principal investigators in the United States. Presented here are the aims of the Department of Meteorology of the University of Wisconsin, Madison, Wisconsin. UW has been responsible for maintaining and deploying the USARP AWS units in Antarctica since July 1980. The scientific aims of the program are to investigate: Barrier winds along the east side of the Antarctic Peninsula and on the east side of the Transantarctic Mountains on the Ross Ice Shelf. The climatic record at Byrd Station, Dome C and Siple Station. Mesoscale circulation on the Ross Ice Shelf south of McMurdo, including the jet-effect wind. Föhn winds down Byrd and Beardmore Glaciers onto the Ross Ice Shelf. Sensible and latent heat fluxes, and atmospheric dynamics on the Ross Ice Shelf. Individual AWS units may provide data for several of the above items and all are useful to the Naval Support Force Antarctica (NSFA) McMurdo Weather Office in support of air operations. The arrangement, locations, and modes of operation of the AWS are described in diagram and text. (Auth. mod.)

I-34672
Bromwich, D.H., **Boundary layer studies in Terra Nova Bay, Antarctica,** *Antarctic climate research,* Sep. 1986 No.1, p.13-16, 10 refs.

Each winter Terra Nova Bay is kept mostly free of sea ice by strong katabatic winds which continually blow down the Reeves Glacier from the East Antarctic plateau and cross the flat Nansen Ice Sheet. High wind speeds and low air temperatures lead to very high ice production rates in this recurring polynya; the ice is continually blown away by the wind, keeping the water and air in direct contact for continued ice formation. This region of intense air-sea interaction is an important oceanic heat sink and atmospheric heat source. Brine rejected during sea ice formation plays an important role in the oceanic circulation in the western Ross Sea. Quantitative *in situ* observations are being acquired to test these conjectures. The katabatic outflow is monitored by an automatic weather station (AWS) which is located on the southern part of Inexpressible Island at an elevation of 78 m. Specific topics being addressed are: documentation of the first order characteristics of the katabatic regime; evaluation of the interaction between the katabatic airstream and the regional atmospheric circulation; and testing the model for the forcing of the Terra Nova Bay polynya. (Auth. mod.)

I-34673
André, J.C., Wendler, G., Zéphoris, M., **"IAGO-Katabatic" programme,** *Antarctic climate research,* Sep. 1986 No.1, p.17-18, 6 refs.

The IAGO (Interaction-Atmosphère-Glace-Océan) programme is aimed at obtaining a better description and understanding of katabatic winds to identify the elements of the phenomenon for inclusion in developing general circulation and climate models. A first and preliminary study (1976-83) was devoted to a detailed near-surface analysis of katabatic winds in a region of Adélie Land. The full-scale experimental study took place during a two-month period of the austral summer 1985-86. Simultaneous measurements of the vertical profiles of atmospheric parameters were made at three sites, distributed over 200 km inland from the coast to monitor the time evolution of the katabatic layer, as well as its stratification and its flow velocity. Different measurement techniques and instrumentation specially adapted and/or developed for this program are implemented in response to various meteorological conditions. (Auth. mod.)

I-34674
Fujii, Y., **Japanese activities on automatic weather observations,** *Antarctic climate research,* Sep. 1986 No.1, p.19-20, 3 refs.

The Japanese experience with automatic weather stations in Antarctica is briefly recounted. The first stations were established in 1980 and in the 1984-85 summer two new systems, ARGOS and CMOS, were set up. Components of these systems are listed. A Japanese climate research program is expected to start in 1987.

I-34675
Vinje, T., **Use of automatic weather stations for surface observations on Bouvetöya,** *Antarctic climate research,* Sep. 1986 No.1, p.21-22.

The Norwegian experience with automatic weather stations on Bouvet Island since 1977 is briefly recounted. Discussed are some of the unusual data applications; peculiarities of surface pressure readings under a NE wind regime; call signs of currently operating units; and the capabilities of the most recently installed equipment.

I-34676
Allison, I., **ANARE automatic weather station program,** *Antarctic climate research,* Sep. 1986 No.1, p.25-30, 6 refs.

The report provides a review of the AWS employed by ANARE since 1971 with an emphasis on the period beginning with 1980. Characteristics and deployments of these units are described and displayed in chart form for three generations of AWS. Data processing and validation methods and results are discussed.

I-34725
Randel, W.J., Stanford, J.L., **Structure of medium-scale atmospheric waves in the Southern Hemisphere summer,** *Journal of the atmospheric sciences,* Sep. 1983 40(9), p.2312-2318, 16 refs.

Recently reported medium-scale wave dominance of the Southern Hemisphere summer circulation is studied using NMC geopotential height fields for the 1978-79 summer. These features, corroborated by independent analyses of satellite microwave measurements, are apparent in meridional thermal winds derived from the NMC grids. Episodes of latitudinal phase structure indicative of

barotropic energy exchange with the mean wind field are observed. An exceptionally clear case of stationary-transient wave interference is observed. The wave kinetic energy is averaged latitudinally over the region 25-65S and integrated vertically from 850 to 50 mb, for a better measure of features that have varying meridional and vertical profiles.

I-34740

Kikuchi, T., Shimamoto, T., Okuhira, F., Ageta, Y., **Meteorological data at Mizuho Station, Antarctica in 1985,** *Japanese Antarctic Research Expedition. JARE data reports,* Sep. 1986 No.120, 78p.

Mizuho Station was established in July 1970, at 70 deg 42 min S, 44 deg 20 min E lying at an elevation of 2230 m above sea level. The international index number 89544 was assigned in 1977. Surface meteorological observations were taken intermittently between July 1970 and Mar. 1976 and continuously after Apr. 1976. The data have been published in JARE data reports which are listed at the end of the report. The present report contains the surface synoptic data taken by JARE-26 in 1985. Surface synoptic reports (FM11-C-Synop) taken at 12 GMT (1500LT) are sent once a day to World Meteorological Center (Melbourne) through Showa Station (Index number 89532) on a real time basis. (Auth. mod.)

I-34752

Callis, L.B., Natarajan, M., **Ozone and nitrogen dioxide changes in the stratosphere during 1979-84,** *Nature,* Nov. 5, 1986 323(6091), p.772-777, 40 refs.

Analyses of stratospheric nitrogen dioxide distributions as measured by 4 different satellite experiments indicate mid-latitude increases of up to 75% during the 1979-84 period. These increases are attributed to enhanced upper atmospheric formation of odd nitrogen during solar cycle 21 with downward transport to the stratosphere. The increases in NO2 provide an explanation for the recently observed dramatic springtime minima in the antarctic ozone and suggest the reason for the reported mid-latitude stratospheric ozone decreases observed by satellite and ground-based stations since the mid 1970s. (Auth.)

I-34754

Kerr, R.A., **Taking shots at ozone hole theories,** *Science,* Nov. 14, 1986 234(4778), p.817-818.

Additional arguments are advanced in the discourse on the cause of the ozone thinning phenomenon over Antarctica in the spring. Impatient proponents of the various theories are unable to muster fool-proof evidence for their choices, leaving all theories up for grabs at present.

I-34782

Mitchell, J.F.B., Hills, T.S., **Sea-ice and the antarctic winter circulation: a numerical experiment,** *Royal Meteorological Society, London. Quarterly journal,* Oct. 1986 112(474), p.953-969, 41 refs.

A numerical experiment has been conducted to test the sensitivity of a global general circulation model to changes in sea-ice extents in the Antarctic during winter. Three 112-day integrations have been made in which all the antarctic sea-ice poleward of 66 S was removed, commencing on 10 June in the second, third and fourth years of a control integration. There was a large increase in sensible heat flux over the anomaly, a warming over the Antarctic confined to the lowest atmospheric layer, and a 2 m/s reduction in the westerly flow around the periphery of the (new) sea-ice margin, in broad agreement with a previous study. The increased heating over the anomaly was accompanied by a decrease in surface pressure which was not found earlier and possible explanations of this discrepancy are considered. The results are related to previous work on the effect of increased CO2 using prescribed changes in sea surface temperature and sea-ice extents. The implications of the results for the parametrization of the heat flux through sea-ice cover, and for coupled ocean-atmosphere models are discussed. (Auth.)

I-34836

Boutron, C.F., Patterson, C.C., **Lead concentration changes in antarctic ice during the Wisconsin/Holocene transition,** *Nature,* Sep. 18, 1986 323(6085), p.222-225, 41 refs. A corrigendum appears in Nature 326(6113): 626, Apr. 9, 1987.

In order to assess current global lead atmospheric pollution, it is necessary to reconstruct the natural, pre-human atmospheric fluxes of this toxic heavy metal. The time variations of these fluxes over the past 27,000 years have been obtained from the analysis of an antarctic ice core. Lead levels are found to have been high during the late Wisconsin and very low during the Holocene. Lead levels from dust, from volcanoes and from sea spray, respectively, are also assessed.

I-34837

Friedli, H., **Ice core record of the C-13/C-12 ratio of atmospheric CO2 in the past two centuries,** *Nature,* Nov. 20, 1986 324(6094), p.237-238, 18 refs.

The release of carbon into the atmosphere due to the activities of humans has caused an increase in concentration as well as a change in the isotopic composition of atmospheric carbon dioxide. CO2 derived from fossil fuel combustion and from biomass destruction have *delta*C-13 values of -25 per mill (compared to the atmospheric value of -7 per mill) and are thus depleted in C-13. *Delta*C-13 of CO2 separated from air trapped in bubbles in ice samples from an ice core taken at Siple Station in Antarctica, was measured. It has been possible to demonstrate the atmospheric increase of CO2 and methane with high time resolution. The isotopic results, together with the CO2 record from the same ice core, yield information on the sources of excess carbon dioxide and provide a data base for testing the consistency of global carbon cycle models. (Auth.)

I-34851

Mokhov, I.I., **Analysis of annual course of zonal temperature field of the troposphere and lower stratosphere of the Southern Hemisphere,** *Soviet meteorology and hydrology,* 1986 No.1, p.17-23, For Russian original see 15I-33806. 6 refs.

Based on a special method of amplitude-phase characteristics, the annual course of the zonal temperature regime of the troposphere and lower stratosphere of the Southern Hemisphere is analyzed. Identified are the space-time features of the thermal structure of different latitude zones from the surface to an altitude of 21 km. The dynamics of the temperature regime of the atmosphere in the annual course differ substantially for the Southern and Northern hemispheres. Noted is the special role of the region related to the "roaring forties," which blocks the mutual influence of Antarctica and equatorial latitudes; the feature of the deep penetration of the thermal effect of the stratosphere into the troposphere south of the boundary of the tropical tropopause; and the features of the spring and autumn temperature dynamics in the vicinity of the antarctic tropopause.

I-34853

Polian, G., Lambert, G., Ardouin, B., Jegou, A., **Long-range transport of continental radon in subantarctic and antarctic areas,** *Tellus,* July-Sep. 1986 38B(3-4), p.178-189, 28 refs.

Gaseous Rn-222, a daughter product of U-238, is injected into the atmosphere from the surface of continents. Its atmospheric cycle is particularly simple since it disappears only by radioactive decay (half-life 3.8 days). Radon measurements obtained over more than 15

years in remote stations in antarctic and subantarctic areas generally give concentrations as low as 0.1 to 2 pCi/cu m. However, it is shown that sharp increases of concentrations occur, reaching 3 to 30 pCi/cu m, called "radonic storms". Owing to the negligible degassing of radon from the sea surface, such peaks are accounted for by long-range transport from remote continents (mainly South Africa) over southern Indian and antarctic oceans, with transit times ranging from 1.5 to 7 days and very low dilution factors of the order of 3 to 7. This air-mass transport is related to warm sectors of cyclonic systems passing over South Africa and around the Antarctic continent. (Auth.)

I-34854

Hogan, A.W., **Aerosol exchange in the remote troposphere,** *Tellus,* MP 2180, July-Sep. 1986 38B(3-4), p.197-213, 35 refs.

Parameters observed and reported here are primarily ozone mixing ratios; maximum and minimum ozone amounts noted near the ITCZ; antarctic aerosol concentrations and transport. Uniform aerosol concentrations were observed in the Antarctic troposphere, except in the vicinity of cirrus layers aloft, and in moist or cloudy layers near the surface. Enhanced ozone mixing ratios occurred in troughs about the periphery of Antarctica, and in slightly turbulent layers near mountains. Ozone and aerosol concentrations observed over a wide geographic area of Antarctica were stratified into two altitude classes, and the results mapped. Ozone concentrations in the mid troposphere (550 to 400 mb levels) were small and nearly invariant over the interior of Antarctica. Ozone concentrations in the upper tropospheric (400-300 mb) layers varied greatly, and became quite large over troughs and about the periphery of Antarctica, and in the vicinity of high mountains. Ozone exchange appears quite vigorous in the upper troposphere and frequent aerosol exchange occurs in the lower troposphere, but the stability of the middle troposphere inhibits mixing among these levels. Vertical profiles of aerosol concentration indicate an aerosol decrease of 25 particles/cu cm/Km in clear air over Antarctica. Moist and/or cloudy air over and near the Ross and Weddell Seas is enhanced with aerosols relative to this dry profile. Moist layers over the interior of Antarctica are also enhanced in aerosol concentration in comparison with dry antarctic air. (Auth. mod.)

I-34855

Ito, T., Morita, Y., Iwasaka, Y., **Balloon observation of aerosols in the antarctic troposphere and stratosphere,** *Tellus,* July-Sep. 1986 38B(3-4), p.214-222, 33 refs.

Balloon soundings of aerosols up to 15 km in height were carried out in 1983 at Showa Station. The vertical distribution of the concentration and size distribution of Mie particles were obtained on 3 June and on 16 October. The vertical distribution of the concentration of Aitken particles was obtained on 17 October. This paper reviews the findings obtained by these soundings and discusses their significance in aerosol processes in the antarctic atmosphere. (Auth.)

I-34856

Bodhaine, B.A., **Aerosol measurements at the South Pole,** *Tellus,* July-Sep. 1986 38B(3-4), p.223-235, 34 refs.

NOAA operates an atmospheric monitoring observatory at Amundsen-Scott Station, South Pole, where long-term measurements of carbon dioxide, ozone, aerosols, and other background pollutants are obtained to understand their possible effects on the earth's climate. The aerosol measurement program consists of the continuous measurement of condensation nuclei (CN) concentration and aerosol scattering extinction coefficient. A nearly continuous record of South Pole CN measurements from 1974 to the present, and aerosol scattering extinction coefficient measurements from 1979 to the present, has now been accumulated. The CN data show an annual cycle with a maximum exceeding 100/cu cm in the austral summer and a minimum of about 10/cu cm in the winter. Aerosol scattering extinction coefficient data show an annual cycle markedly different from that of CN with a maximum in late winter, a secondary maximum in summer, and a minimum in May. Angstrom exponents calculated from the multiwavelength aerosol scattering extinction coefficient data show a strong annual cycle suggesting larger particles in the winter than in the summer. (Auth.)

I-34857

Legrand, M.R., Delmas, R.J., **Relative contributions of tropospheric and stratospheric sources to nitrate in antarctic snow,** *Tellus,* July-Sep. 1986 38B(3-4), p.236-249, 46 refs.

On the basis of some 500 firn samples from a number of antarctic sites it is shown that nitrate is deposited as gaseous HNO3 and that tropospheric sources dominate in Antarctica. Continental and anthropogenic nitrates are not significant contributors. It is suggested that lightning at tropical and/or mid latitudes is the most likely source of antarctic nitrate. The formation of HNO3 (or its precursors) in the stratosphere is discussed and the possible evidence for this contribution in several profiles is carefully investigated. The absence of a convincing correlation between solar factors and nitrate concentrations in snow confirms that past solar activity fluctuations cannot be reconstructed from polar ice cores. The spatial and temporal variations observed in this study are, however, not fully explained. Finally, emphasis is placed on the necessity of undertaking HNO3 measurements in the antarctic atmosphere in order to elucidate the deposition mechanism of this major component of atmospheric chemistry. (Auth.)

I-34874

Penkett, S.A., Jones, B.M.R., Rycroft, M.J., Simmons, D.A., **Interhemispheric comparison of the concentrations of bromine compounds in the atmosphere,** *Nature,* Dec. 12, 1985 318(6046), p.550-553, 16 refs.

At least seven organic bromine compounds have been positively identified in the atmosphere and others have been observed in coastal seawater samples. The atmospheric chemistry of bromine compounds has considerable consequence in the stratosphere, where bromine acts as a more efficient catalyst than chlorine in removing ozone. Several bromine compounds also fulfil an important role in the geochemical cycling of the element through the troposphere. Here are presented measurements of four bromine compounds (CF3Br, CH3Br, CH2Br2 and CHBr3) over a large latitudinal range (40N to 75S). These data suggest that the major source of bromine in the atmosphere could be bromoform (CHBr3), probably emitted from the ocean and with a short lifetime due to photolysis. The data also suggest that the major emission of methyl bromide (CH3Br), and hence most bromine entering the stratosphere, will be anthropogenic.

I-34897

Bennett, T.J., Jr., Hunkins, K., **Atmospheric boundary layer modification in the marginal ice zone,** *Journal of geophysical research,* Nov. 15, 1986 91(C11), p.13,033-13,044, 38 refs.

A case study of the Andreas et al. (1984) data on atmospheric boundary layer modification in the marginal ice zone is made. The Andreas et al data deals with the boundary layer, drag, and surface heat flux in the marginal ice zone of the Antarctic. A two-dimensional, multilevel, linear model with turbulence, lateral and vertical advection, and radiation is proposed. Good agreement between observed and modeled temperature cross sections is obtained. In contrast to the hypothesis of Andreas et al., the air flow is found to be stable to secondary circulations. Adiabatic lifting and, at long fetches, cloud top longwave cooling, not an air-to-surface heat flux, dominate the

cooling of the boundary layer. The accumulation with fetch over the ice of changes in the surface wind field is shown to have a large effect on estimates of the surface wind stress. It is suggested that the Andreas et al. estimates of the drag coefficient over the compact sea ice are too high. (Auth.)

I-34902

Jones, P.D., Raper, S.C.B., Wigley, T.M.L., **Southern Hemisphere surface air temperature variations: 1851-1984,** *Journal of climate and applied meteorology,* Sep. 1986 25(9), p.1213-1230, 27 refs.

A new compilation of monthly mean surface air temperature data for the Southern Hemisphere for 1851-1984 is presented based on land-based meteorological station data. Where possible, the station data used in the analysis have been assessed for homogeneity. Only reliable or corrected station data have been used in calculating area averages. Grid point temperature estimates have been made by interpolating onto a 5 deg by 10 deg long grid for each month of the 134 years. For the period of best data coverage, 32% of the area of the Southern Hemisphere is covered. The reliability of hemispheric estimates is assessed for earlier periods when coverage is less than this maximum. Year-to-year estimates are considered reliable back to about 1890 and earlier estimates can indicate trends back to the 1860s. This new hemispheric compilation is compared with estimates of Southern Hemisphere marine data, and comparisons between land and marine data for both hemispheres are made and interpreted. The data show a long-term warming trend amounting to about 0.5 deg C over the past 100 years. The 1938-65 cooling trend that is so evident in the Northern Hemisphere data shows up only as a hiatus in the long-term warming of the Southern Hemisphere, pointing towards some hemispherically specific causal mechanism. Antarctic surface temperatures are used sporadically from 1851-1956, but the full range of antarctic data was available and utilized from 1957 through the end of the study. (Auth. mod.)

I-34914

Barry, R.G., **Possible CO2-induced warming effects on the cryosphere,** Climatic changes on a yearly to millennial basis. Second Nordic Symposium on Climatic Changes and Related Problems, Stockholm, Sweden, May 16-20, 1983. Edited by N.-A. Mörner and W. Karlén, Dordrecht, D. Reidel, 1984, p.571-604, Refs. p.593-604.

DLC QC884.2.C5C575

This study updates preliminary assessments, in earlier studies, of the possible impacts of projected climatic perturbations on global snow and ice cover. It also attempts to develop a composite picture from modelling results, analytical projections, and analogs based on other warm climatic intervals. Components of global ice and snow cover—area, volume, and sea level equivalent—are tabulated, showing that 10% of the antarctic ice is in West and 90% in East Antarctica. It is suggested that possible changes in ice sheet accumulation rates should be monitored at regular intervals for large-scale transects across key areas in Antarctica and Greenland using satellite laser altimetry.

I-34915

Flohn, H., **Climatic belts in the case of a unipolar glaciation,** Climatic changes on a yearly to millennial basis. Second Nordic Symposium on Climatic Changes and Related Problems, Stockholm, Sweden, May 16-20, 1983. Edited by N.-A. Mörner and W. Karlén, Dordrecht, D. Reidel, 1984, p.609-620, Refs. p.618-620.

DLC QC884.2.C5C575

The spatially different history of the large continental ice caps of Antarctica and Greenland and of the Arctic and Antarctic ice are reviewed, and evidence for the unipolar glaciations is presented. The changes in the land-sea pattern and mountain height since that time, involving changes in oceanographic circulations, such as the development of the cold Labrador Current and the evolution of the large monsoon system, are reviewed. An attempt is made to estimate the climatic zonation of a unipolar glaciated Earth whereby the different heat budget terms are evaluated and extrapolated to conditions of unipolar glaciation, including extrapolation of the tropospheric lapse rate above an ice free Arctic Ocean and a final estimation of the shift of the climatic belts. The semiempirical results obtained are shown to be, in principle, coherent with the model results of the GFDL group.

I-34923

Crutzen, P.J., Arnold, F., **Nitric acid cloud formation in the cold antarctic stratosphere: a major cause for the springtime 'ozone hole',** *Nature,* Dec. 25, 1986 324(6098), p.651-655, 29 refs.

A chemical mechanism is proposed for the formation of the ozone hole. It involves removal of gaseous odd nitrogen by ion- and/or aerosol-catalysed conversion of N2O5 and ClONO2 to HNO3 vapor, followed by heteromolecular HNO3-H2O condensation, leading to HNO3-H2O aerosols. At an altitude of 17 km, these processes start at temperatures below 205 K, well above the condensation temperature of pure water vapor. We propose that the absence of gaseous odd nitrogen and catalytic methane oxidation reactions driven by sunlight in early spring lead to large OH concentrations which rapidly convert HCl to ClOX. Catalytic reactions of ClOC and BrOX cause drastic ozone destructions and can account for the springtime 'ozone hole'. By our model the depletion would be mainly due to emissions of industrial organic chlorine compounds. Arctic regions may also become affected. The depletion lasts while HNO3, but not HCl, is incorporated in the particles in the temperature range 205 K to 192 K. (Auth. mod.)

I-34929

Maeda, K., Heath, D.F., **Asymmetries of the upper stratospheric ozone distribution between two hemispheres,** *Journal of the atmospheric sciences,* May 1983 40(5), p.1353-1359, 21 refs.

Based on the Nimbus-7 solar backscattered UV-radiation (SBUV) data which are free from the instrumental background noise produced by magnetospheric particles, southern winter hemispheric ozone densities in the upper stratosphere are nearly 20% higher than their counterparts in the Northern Hemisphere; *i.e.,* the ozone mixing ratios at the 1.5 mb (45 km) level are 10.2 micro g/g at 60 S in July 1979 versus 8.5 micro g/g at 60 N in December 1979. This is in significant contrast to the well-known hemispheric asymmetry of the total ozone content which is higher in the northern hemispheric winter than in the southern hemispheric winter. Comparisons of those findings with the previously obtained similar results from the Nimbus-4 backscattered UV radiation (BUV) experiment have manifested that the dark-current effect on the latter was negligible. Therefore, using the stratospheric temperature observed by selective chopper radiometer (SCR) simultaneously with the BUV experiments on the Nimbus-4 for 1970 and 1972, the cause of these asymmetries due to temperature dependent photochemistry is examined. The results are discussed. (Auth. mod.)

I-34930

Steele, H.M., Hamill, P., McCormick, M.P., Swissler, T.J., **Formation of polar stratospheric clouds,** *Journal of the atmospheric sciences,* Aug. 1983 40(8), p.2055-2067, 43 refs.

Measurements of the stratospheric aerosol by SAM II during the northern and southern winters of 1979 showed a pronounced increase in extinction on occasions when the temperature fell to a low value (below 200 K). In this paper the correlation between extinction and

temperature is evaluated from thermodynamic considerations. As the temperature falls, the hygroscopic aerosols absorb water vapor from the atmosphere, growing as they do so. The effect of the temperature on the size distribution and composition of the aerosol is determined, and the optical extinction at 1 micron wavelength is calculated using Mie scattering theory. Theoretical predictions of the change in extinction with temperature and humidity are compared with the SAM II results at 100 mb, and the water vapor mixing ratio and aerosol number density are inferred from these results. A best fit of the theoretical curves to the SAM II data gives a water vapor content of 5-6 ppmv, and a total particle number density of 6-7 particles/cu cm. (Auth.)

I-34931

Lysakov, E.P., **Circumpolar eddy dynamics in the Southern Hemisphere** [Dinamika tsirkumpoliarnogo vikhria iuzhnogo polushariia], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1981 Vol.370, p.19-25, In Russian. 4 refs.

DLC G600.L4

From data collected over many years, it is concluded that the Southern Hemisphere circumpolar eddies reach their maximum amplitudes and intensities near the 200 mb level, and that the current axis of the eddies' fundamental energy accumulation occurs in the 45-50S zone. An empirical model of the vertical pressure distribution is presented, and the role of vertical air exchange in dynamic variations of the South Polar system is discussed.

I-34932

Donina, S.M., **Temporal air-temperature structure in the Antarctic** [O vremennoĭ strukture temperatury vozdukha v Antarktike], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1981 Vol.370, p.40-44, In Russian. 4 refs.

DLC G600.L4

The space-time features of the surface thermal structure of air masses over various antarctic stations, for the months of Jan. and July, are discussed. Quantitative data on the interactions and variations of air temperature useful in weather forecasting are presented.

I-34933

Kolosova, N.V., **Homogeneity of series of mean monthly wind speed data for Soviet antarctic stations** [Ob odnorodnosti riadov srednemesiachnoĭ skorosti vetra na sovetskikh antarkticheskikh stantsiiakh], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1981 Vol.370, p.45-54, In Russian. 5 refs.

DLC G600.L4

Investigation of structural features of the scalar velocity of surface winds, based on parametric and nonparametric criteria, is reported. Results found at coastal stations Mirnyy and Molodezhnaya differ from those found at the inland station Vostok, where a significant increase of yearly dispersion fluctuation is shown.

I-34934

Kolosova, N.V., **Surface wind velocity profiles in Antarctica** [O profile prizemnoĭ skorosti vetra v Antarktide], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1981 Vol.370, p.55-62, In Russian. 13 refs.

DLC G600.L4

Results of analyses of wind velocity, measured at two levels at Vostok and Mirnyy stations, are presented. It is shown that on the coast, where katabatic winds prevail throughout the year, the differences of the mean wind velocity values at the boundaries of the 6-8 m layer above surface agree well with logarithmic law of wind velocity changes with height. Over the Antarctic Plateau which is characterized by constant large-scale inversions, the wind velocity profile is closer to an exponential correlation. It is shown that the most stable relationships occur in summer, the least stable ones during the transition seasons.

I-34935

Petrov, L.S., Kolosova, N.V., **Some characteristics of time dependence in series of atmospheric pressure values at antarctic stations** [Nekotorye osobennosti vremennykh vzaimosviazeĭ v riadakh znacheniĭ atmosfernogo davleniia na antarkticheskikh stantsiiakh], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1981 Vol.370, p.63-73, In Russian. 5 refs.

DLC G600.L4

On the basis of 4 times daily meteorological observations conducted over a period of several years at antarctic stations, the structure of standard autocorrelation coefficient is discussed. It is shown that the greatest stability is found in the summer period, the least in the transition periods.

I-34942

Zerefos, C.S., ed, Ghazi, A., ed, **Atmospheric ozone: proceedings of the Quadrennial Ozone Symposium held in Halkidiki, Greece, 3-7 September, 1984,** Dordrecht, D. Reidel Publishing Company, 1985, 842p., For selected papers see I-34943 through I-34947.

The book is classed into nine chapters, including papers presented at the nine symposium sessions. Chapters deal with: model calculations; ozone-climate interactions; budgets of trace elements; ozone observations analyzed; recent observational techniques; radiation and ozone; and non-urban tropospheric ozone.

I-34943

McKenzie, R.L., Johnston, P.V., **Southern Hemisphere nitrogen dioxide,** Ozone Symposium, Halkidiki, Greece, Sep. 1984. Proceedings. Edited by C.S. Zerefos and A. Ghazi, Dordrecht, D. Reidel Publishing Co., 1985, p.163-167, 18 refs.

DLC QC879.7.G74 1984

Results from ground based observations of stratospheric nitrogen dioxide from two Southern Hemisphere sites are compared. The measurement method used is long path absorption spectroscopy of scattered sunlight in the wavelength range 435-450 nm. At a midlatitude site in New Zealand (45 S) column amounts of NO2 are dominated by photochemistry whereas in a high latitude site in Antarctica (78 S) transport effects are more important. Aspects of the simultaneous measurement of ozone from the same data set and the interpretation of any correlations are discussed. (Auth.)

I-34944

Chubachi, S., **Special ozone observation at Syowa Station, Antarctica from February 1982 to January 1983,** Ozone Symposium, Halkidiki, Greece, Sep. 1984. Proceedings. Edited by C.S. Zerefos and A. Ghazi, Dordrecht, D. Reidel Publishing Co., 1985, p.285-289, 6 refs.

DLC QC879.7.G74 1984

Atmospheric ozone plays a significant role in the heat balance of the stratosphere. Its behavior at high latitude is of special interest since stratospheric ozone at high latitude is thought to be transported from lower latitude through dynamic processes. However, knowledge so far is limited because ozone data at high latitude are sparse. There are only two ozone stations operating in Antarctica: Showa Station (69 S) and Amundsen-Scott (90), where the total ozone has been observed in sunlit months only. To make up this deficiency ex-

tensive observations were carried out at Showa Station as a part of the international project of Middle Atmosphere Program (MAP). This paper gives some preliminary results of this observation. (Auth.)

I-34945

Belmont, A.D., **Time-periodic variations in ozone and temperature,** Ozone Symposium, Halkidiki, Greece, Sep. 1984. Proceedings. Edited by C.S. Zerefos and A. Ghazi, Dordrecht, D. Reidel Publishing Co., 1985, p.300-304.

DLC QC879.7.G74 1984

The variations in zonal mean ozone and temperature from 30-60 km are compared, with emphasis on annual and semi-annual periods. Seven years of data from Nimbus 4 and 5 BUV and SCR instruments are used to prepare altitude-latitude diagrams of amplitude and phase. There are two high-latitude equinoctial semi-annual waves at 40 km, whose cause is apparently the overlap of two annual waves. Temperature and ozone are in phase near 5 mb or below, and out-of-phase near 2 mb and above. The thickness and altitude of the transition zone between them varies greatly with latitude and time, as shown by daily correlation patterns. Charts included in the paper extend the data to about 70S. (Auth.)

I-34946

Bowman, K.P., **Global climatology of total ozone from the NIMBUS-7 total ozone mapping spectrometer,** Ozone Symposium, Halkidiki, Greece, Sep. 1984. Proceedings. Edited by C.S. Zerefos and A. Ghazi, Dordrecht, D. Reidel Publishing Co., 1985, p.363-367, 1 ref.

DLC QC879.7.G74 1984

A global climatology of total column ozone was computed from four years of daily observations by the Total Ozone Mapping Spectrometer (TOMS) aboard the NIMBUS-7 satellite. The precision of the TOMS retrievals with respect to well-maintained Dobson instruments is 2%. The TOMS retrievals average 6% lower than the Dobson measurements. The bias is largely explained by differences in the ozone absorption coefficients used with the different instruments. Global maps of the time-mean total ozone and the amplitude, phase, and fraction of the variance explained by the annual and semiannual harmonics were prepared. Similar analyses of the zonal-mean total ozone were carried out. Maps included with this paper extend in the antarctic regions. (Auth.)

I-34947

Oltmans, S.J., **Tropospheric ozone at four remote observatories,** Ozone Symposium, Halkidiki, Greece, Sep. 1984. Proceedings. Edited by C.S. Zerefos and A. Ghazi, Dordrecht, D. Reidel Publishing Co., 1985, p.796-802, 3 refs.

DLC QC879.7.G74 1984

Continuous observation of ozone near the surface at the four Geophysical Monitoring for Climatic Change (GMCC) observatories over the past ten years reveals important characteristics of the ozone variability of the troposphere. An observational record of this length not only gives information on the diurnal, day-to-day and seasonal variations, but also is sufficient to analyze long term trends. Ozonesonde observations are used to judge the representativeness of the near surface observations as indicators of tropospheric ozone behavior. Amundsen-Scott Station observatory is one of the four for which ozone measurements are included and analyzed. (Auth.)

I-34951

Schoeberl, M.R., Krueger, A.J., **Overview of the antarctic ozone depletion issue,** *Geophysical research letters,* Nov. 1986 13(12), p.1191-1192, 7 refs.

This article serves as an introduction to a series of papers intended to provide a scientific forum for presentation of observations and theoretical models of the year-to-year decline in antarctic spring total ozone. No clean link is established between this depletion and man-made pollutants, and a number of papers present alternatives to, and constraints on, the suggested chemical scenarios. Several theories of the ozone depletion are discussed.

I-34952

Bowman, K.P., **Interannual variability of total ozone during the breakdown of the antarctic circumpolar vortex,** *Geophysical research letters,* Nov. 1986 13(12), p.1193-1196, 14 refs.

Data from the Total Ozone Mapping Spectrometer (TOMS) on the Nimbus 7 satellite are compared with Dobson spectrophotometer measurements from the Antarctic, where a large decrease in Oct. total ozone has been observed over the last decade. It has been hypothesized that the decrease is caused by local photochemical effects of man-made chlorofluorocarbons. The TOMS data, which start in 1978, agree well with the Dobson data, confirming the low values of recent years. However, during the Southern Hemisphere spring, total ozone in the Antarctic is strongly affected by transport associated with the breakdown of the stratospheric vortex. The strength and timing of the vortex breakdown are highly variable and can have a large effect on monthly-mean total ozone values. The TOMS data suggest that variations in the stratospheric circulation have contributed to the long-term decrease. Large variations in total ozone are not confined to the Antarctic. Zonal-mean ozone values have also decreased in the Northern Hemisphere spring during the TOMS observing period. (Auth.)

I-34953

Chubachi, S., Kajiwara, R., **Total ozone variations at Syowa, Antarctica,** *Geophysical research letters,* Nov. 1986 13(12), p.1197-1198, 5 refs.

Monthly mean total ozone data from Showa Station for 1961-1985 show ozone to have been decreasing in Oct. months, particularly after 1980. Data for 1974-1985 exhibit total ozone decrease during Sep. throughout Mar. months, with particularly large decrease occurring in Oct. and Nov. Observations were not made during Apr. through Aug. months. (Auth.)

I-34954

Gardiner, B.G., Shanklin, J.D., **Recent measurements of antarctic ozone depletion,** *Geophysical research letters,* Nov. 1986 13(12), p.1199-1201, 2 refs.

Measurements of total ozone at Halley Bay are presented for the 6 most recent observing seasons, 1980-86, showing the consistency and progress of the spring ozone depletion. The principal ozone minimum of Oct. 1985 was as deep as that of 1984, if not deeper. However, the period of depletion was affected by strong wave activity, giving rise to 4 distinct minima. A cusped maximum in total ozone was observed at Halley Bay on Oct. 19, 1985, confirmed by temperatures in the lower stratosphere and by a similar ozone maximum at Faraday Station. In the presence of such fluctuations, it is not possible to say whether the ozone depletion has reached its limit or not; indeed several years' data will yet be needed before that question can be answered. Ozone amounts recorded in the summer period Dec. 1985 to Feb. 1986 remain marginally lower than in the past. (Auth.)

I-34955

Sekiguchi, Y., **Antarctic ozone change correlated to the stratospheric temperature field,** *Geophysical research letters,* Nov. 1986 13(12), p.1202-1205, 4 refs.

Total ozone and ozonesonde data, obtained at Showa Station, are analyzed together with radiosonde data in the lower stratosphere. Very high correlation coefficients between monthly mean values of ozone and stratospheric temperature suggest a clear relation between

stratospheric circulation and ozone amount. The rapid decrease of the antarctic ozone in recent years might be caused by the extraordinary change in the circulation. A rapid decrease of the temperature in the lower stratosphere above Showa Station, in spring months of recent years is noted. This conclusion is endorsed by analysis of ozonesonde observations in 1982. The year-to-year change of both total ozone and stratospheric temperature suggests the influence of changes in solar activity. (Auth.)

I-34956

Newman, P.A., Schoeberl, M.R., **October antarctic temperature and total ozone trends from 1979-1985,** *Geophysical research letters,* Nov. 1986 13(12), p.1206-1209, 11 refs.

The morphology of temperature trends in the south polar stratosphere from 1979-1985 is detailed. A significant cooling has occurred in the stratosphere over this period. South polar Oct. mean temperatures have declined 18 K at 24 km over the seven year period. A large fraction of this decline occurs as a result of including 1979 temperatures in the trend. The years 1979 and 1982 differ from other years in that they include large mid-Oct. wave events which produce significantly warmer polar temperatures. Nevertheless, a significant temperature decline has still occurred in the stratosphere even when the dynamically active years are not included. Comparing two relatively dynamically quiet years, 1980 and 1985, the largest temperature decrease in the 30 mb temperature field occurs not at the pole but in the sub-polar temperature maximum centered near 60 S. The changes in temperature of both the maximum and the polar low regions correlate fairly well with total ozone changes observed by TOMS. (Auth.)

I-34957

Stolarski, R.S., Schoeberl, M.R., **Further interpretation of satellite measurements of antarctic total ozone,** *Geophysical research letters,* Nov. 1986 13(12), p.1210-1212, 13 refs.

Both dynamical and chemical mechanisms have been advanced to explain the decrease in total ozone in the antarctic spring. Further analysis of satellite measurements show that during any one year the Sep. decline in total ozone near the South Pole is compensated by an increase at mid-latitudes. The total ozone amount from 44 S to the pole remains almost unchanged from Aug. through Nov. even though both the polar and mid-latitude values reach extremes during this period. These observations suggest that the variations within the spring season in south polar total ozone are governed by dynamical redistribution rather than chemical processes. (Auth.)

I-34958

McPeters, R.D., Hudson, R.D., Bhartia, P.K., Taylor, S.L., **Vertical ozone distribution in the antarctic ozone minimum measured by SBUV,** *Geophysical research letters,* Nov. 1986 13(12), p.1213-1216, 5 refs.

The ozone profiles measured by SBUV in the region of the antarctic ozone minimum are in error as archived for altitudes below the 7 mb level in the atmosphere because of the lack of a reasonable climatology to use for the initial guess profile. The ozone profile error in this region is examined and it is shown that use of a reasonable climatology in this unusual region results in ozone profiles that agree substantially better with the balloon observations available from Showa Station. The corrected profiles show that by 1984 there was 35% less ozone in the 15 to 30 km region than in 1979, and 14% less even in the 40 to 50 km region. (Auth.)

I-34959

Schoeberl, M.R., Krueger, A.J., Newman, P.A., **Morphology of antarctic total ozone as seen by TOMS,** *Geophysical research letters,* Nov. 1986 13(12), p.1217-1220, 6 refs.

A more detailed examination of the TOMS observations reveals a number of important aspects of the antarctic ozone depletion. First, it is noted that the presence of large scale disturbances around the edge of the ozone hole can lead to highly variable station observations. Second, an examination of the zonal mean total ozone for seven octobers shows that the large systematic decline is not simply confined to the polar region but exists at mid-latitudes as well. Integrations of the total ozone from the South Pole northwards show that a portion of the systematic trend of decreasing antarctic total ozone (prior to 1985) seems to be due to a redistribution of total ozone to subpolar and mid-latitude regions. That is, decreases at high latitudes are compensated by increases at lower latitudes. The correlation between zonal mean total ozone and 70 mb zonal mean temperatures from polar to mid-latitudes shows that the systematic decrease in total ozone is well correlated with a systematic decrease in stratospheric temperatures. (Auth.)

I-34960

Chubachi, S., **On the cooling of stratospheric temperature at Syowa, Antarctica,** *Geophysical research letters,* Nov. 1986 13(12), p.1221-1223, 9 refs.

Strong cooling is observed from 1974 to 1985 of the 100 mb temperature in Nov. at Showa Station. Similar cooling is also seen in other pressure levels (70, 50, and 30mb levels) and other months. The rate of change for each month is very similar to the one of total amount of ozone at Showa. A simple model is proposed which links ozone and temperature decrease in Antarctica. (Auth.)

I-34961

Chandra, S., McPeters, R.D., **Some observations on the role of planetary waves in determining the spring time ozone distribution in the Antarctic,** *Geophysical research letters,* Nov. 1986 13(12), p.1224-1227, 10 refs.

Ozone measurements from 1970 to 1984 from the Nimbus 4 backscattered ultraviolet (SBUV) spectrometers show significant decrease in total ozone only after 1979. The downward trend is most apparent in Oct. south of 70 S in the longitude zone 0 to 30 W where planetary wave activity is weak. Outside this longitude region, the trend in total ozone is much smaller due to strong interannual variability of wave activity. This paper gives a phenomenological description of ozone depletion in the antarctic region based on vertical advection and transient planetary waves. (Auth.)

I-34962

Newman, P.A., **Final warming and polar vortex disappearance during the Southern Hemisphere spring,** *Geophysical research letters,* Nov. 1986 13(12), p.1228-1231, 10 refs.

Seven years (1979-1985) of NMC data are used to analyze Southern Hemisphere middle stratosphere winter-to-summer circulation transitions. These transitions are classified into two extreme categories: a mid-Oct. wave event (1979 and 1982), and a mid-Nov. final warming with no strong Oct. wave event (1980-1981). After the final warming a wave event in late Nov.-early Dec. results in the disappearance of the polar vortex. All of these wave events in conjunction with zonal mean mass motions act to reduce zonal mean gradients of potential vorticity and ozone through horizontal mixing, and hence they act to destroy the vortex and fill the ozone hole. Additionally, it is noted that the final warming and the vortex breakdown are two distinct events separated by 15-40 days. Finally, past studies show that the time of these events has not radically changed. (Auth.)

I-34963
Farrara, J.D., Mechoso, C.R., **Observational study of the final warming in the Southern Hemisphere stratosphere,** *Geophysical research letters,* Nov. 1986 13(12), p.1232-1235, 6 refs.

The final warming in the Southern Hemisphere stratosphere during the period Sep. 1-Nov. 30 for 1978-1983 is studied. The change in zonally averaged temperatures during that period is almost the same for each year. However, there is substantial interannual variability in the time evolution of the warming as events of enhanced wave, mean-flow interaction associated with bursts of upward propagating planetary waves develop at different times in different years. Polar temperatures in the middle stratosphere can increase as much as about 20 K in 4 days during these events. Such dynamical processes can play a significant role in the interannual variability of stratospheric ozone and other constituents. (Auth.)

I-34964
Bojkov, R.D., **1979-1985 ozone decline in the Antarctic as reflected in ground based observations,** *Geophysical research letters,* Nov. 1986 13(12), p.1236-1239, 9 refs.

Since 1979, from late Sep. to the end of Nov., the total ozone over the southern polar region has declined by up to 30%, compared with the ozone average for 1957-78. During the rest of the year there are no indications of a major decline. Neither are there significant changes in the middle latitudes surrounding Antarctica except those related to the QBO. More than 85% of the entire ozone deficiency is observed between 10 and 24 km. The rapid ozone and temperature increase in spring usually occurs in mid Oct. and shows a 2 month lag, compared to the Arctic. The increase is related to the time of the breakdown of the winter stratospheric polar vortex. During the last 6 years the breakdown has occurred around mid-Nov., extending the period with circumpolar circulation by 3-4 weeks. It is suggested that weak upward motions within the vortex, in the order of 0.1 cm/sec during Sep. and Oct., could cause part of the ozone decline. (Auth.)

I-34965
Angell, J.K., **Close relation between antarctic total-ozone depletion and cooling of the antarctic low stratosphere,** *Geophysical research letters,* Nov. 1986 13(12), p.1240-1243, 3 refs.

Nearly 5500 mean-monthly low-stratospheric temperatures at 100, 50 and 30 mb at 16 antarctic stations have been extracted from "Monthly Climatic Data for the World" for 1958-1985. About 450 mean-monthly total-ozone values at 4 antarctic stations have been extracted from "Ozone Data for the World" for the same interval. There has been an impressive in-phase relation between seasonal variations in low-stratospheric temperature and total ozone in Antarctica. This relation extends not only to the large total-ozone and low-stratospheric temperature decreases since 1978 in the Southern Hemisphere spring, but also to minor fluctuations in this and other seasons. The springtime stratospheric temperature decreases since 1978 are indicated to have been greatest along the antarctic coast between about 30 W and 60 E; there has been practically no low-stratospheric temperature decrease at stations 10 degrees of latitude further north on the Antarctic Peninsula. The springtime temperature decrease has been pretty much confined to the antarctic stratosphere, or to levels above about 300 mb. (Auth.)

I-34966
Rood, R.B., **Global ozone minima in the historical record,** *Geophysical research letters,* Nov. 1986 13(12), p.1244-1247, 19 refs.

The magnitude and structure of the global total ozone minimum between 1958 and 1962 is similar to that observed between 1979 and 1983. Analysis of the single station data that exhibit the most pronounced minima suggests that the spatial structure of the global minimum is different from the currently observed reduction. Very low north polar values were observed, but there is no indication of anomalously low ozone in Antarctica. The temporal relationship to the sunspot cycle is similar in both time periods. Rather than solar terrestrial interaction, however, a more likely explanation of the early 1960's reduction is normal climatology caused by a persistent period of planetary wave activity. Such a natural explanation may also be appropriate for the current depletion. (Auth.)

I-34967
Komhyr, W.D., Grass, R.D., Leonard, R.K., **Total ozone decrease at South Pole, Antarctica, 1964-1985,** *Geophysical research letters,* Nov. 1986 13(12), p.1248-1251, 5 refs.

Mean monthly total ozone data obtained at South Pole during 1964-1985 are presented. Preliminary analysis of the data suggests that total ozone has decreased at South Pole by roughly 20% since the mid-1960's. Largest decreases have occurred during Oct. and Nov. months, but autumn and winter months also exhibit a decrease. During Feb. months, ozone has increased slightly. Superimposed on the long-term downward ozone trend are episodic decreases in ozone dating back to 1965 that have occurred at intervals of 4-6 years. These decreases are shown to be related to delays in stratospheric warmings in Antarctica and the transport of ozone into Antarctica each spring. (Auth.)

I-34968
Hofmann, D.J., Rosen, J.M., Harder, J.A., Rolf, S.R., **Ozone and aerosol measurements in the springtime antarctic stratosphere in 1985,** *Geophysical research letters,* Nov. 1986 13(12), p.1252-1255, 18 refs.

Balloonborne measurements of ozone and aerosol concentrations at McMurdo Station in Nov. 1985 indicated large variations, apparently associated with movement of the polar vortex. Extremely low ozone concentrations were observed, on one occasion to altitudes in excess of 30 km. Low ozone was accompanied by the absence of optically active aerosol and an enhancement of condensation nuclei while the opposite was the case with normal ozone. The ozone measurements are consistent with a springtime antarctic vortex ozone minimum (popularly called the ozone hole) and variations in the aerosol size distribution appear to be associated with the thermal history of the relevant air parcel. (Auth.)

I-34969
Austin, J., Remsberg, E.E., Jones, R.L., Tuck, A.F., **Polar stratospheric clouds inferred from satellite data,** *Geophysical research letters,* Nov. 1986 13(12), p.1256-1259, 13 refs.

Anomalously high radiances from the ozone channel of the Limb Infra-red Monitor of the Stratosphere (LIMS) sounding instrument have been observed in the Northern Hemisphere winter lower stratosphere. Such events, thought to be due to polar stratospheric clouds (PSCs) are examined further by computing relative humidities using Stratospheric Sounding Unit (SSU) temperatures and water vapor measurements from the LIMS Map Archive Tape (MAT) analyses. Applying a similar approach to the Southern Hemisphere, in 1979, virtually no PSCs are found in the vortex after 10 Sep. at 20 km. This result has important implications for a number of proposed explanations for the Antarctic ozone hole. (Auth.)

I-34970
Keys, J.G., Johnston, P.V., **Stratospheric NO2 and O3 in Antarctica: dynamic and chemically controlled variations,** *Geophysical research letters,* Nov. 1986 13(12), p.1260-1263, 11 refs.

Ground based measurements of stratospheric NO2 made from Arrival Heights are compared with TOMS satellite total ozone meas-

urements and upper air meteorological data. The observations show the seasonal effects of partitioning on NO2 and the influence of wave driven transport on both the NO2 and O3 column in spring. It is concluded that stratospheric air appearing over the site in spring during low pressure conditions is representative of the cold core of the polar vortex, which has effectively been isolated from lower latitude air. Within this core, photochemical processes influencing the ozone column amount and NO2 levels can proceed without marked influence from transport effects. (Auth.)

I-34972

Shibasaki, K., Iwagami, N., Ogawa, T., **Stratospheric nitrogen dioxide observed by ground-based and balloon-borne techniques at Syowa Station (69.0S, 39.6E),** *Geophysical research letters,* Nov. 1986 13(12), p.1268-1271, 16 refs.

Seasonal variation of vertical column density of stratospheric NO2 was determined for the period Mar. 1983 to Jan. 1984 by means of ground-based visible absorption spectroscopy at Showa Station. The values obtained are nearly equal to, or a little smaller, than those observed at northern high latitudes. The nighttime decay of column density was small from autumn to early spring. A rapid increase in column density occurred at the end of Sep. before the minimum of total ozone content in mid-Oct. This behavior suggests that both dynamical and photochemical processes may be involved in the antarctic ozone depletion. In the lower stratosphere below 25 km, variability in NO2 density seems to be large due to dynamical effects. (Auth.)

I-34973

Cronn, D.R., **Atmospheric trace gas trends at Palmer Station, Antarctica: 1982-1985,** *Geophysical research letters,* Nov. 1986 13(12), p.1272-1275, Refs. p.1274-1275.

Measurements of CFCl3, CF2Cl2, CH3CCl3, CCl4 and N2O at Palmer Station from Feb. 4, 1982 to Nov. 30, 1985 are reported. For the week beginning Jan. 1, 1984, the averages of the hourly measurements were 199.6 ppt for CFCl3, 329.0 ppt for CF2Cl2, 124.2 ppt for CH3CCl3, 150.2 ppt for CCl4, and 301.3 ppb for N2O. The mixing ratios increased at an annual rate of 5.87%/y for CFCl3, 5.45%/y for CF2Cl2, 5.31%/y for CH3CCl3, 1.29%/y for CCl4, and 0.24%/y for N2O. (Auth.)

I-34974

McCormick, M.P., Trepte, C.R., **SAM II measurements of antarctic PSC's and aerosols,** *Geophysical research letters,* Nov. 1986 13(12), p.1276-1279, 19 refs.

Measurements by the SAM II satellite instrument show that polar stratospheric clouds (PSC's) are a regular feature of the austral winter season in either nonvolcanically or volcanically disturbed periods. The tops of these clouds are observed above 20 km in early einter and descend in altitude over the course of the season to heights near 15 km in mid Sep. Typically, PSC's persist in the lowest stratospheric altitudes throughout Sep. Subsequently, Oct. always represents a relative annual minimum in aerosol extinction above 15 km and in stratospheric column amount. In addition, volcanically produced aerosols in Antarctica peaked in early 1983 and, if linearly related to ozone losses, are probably not a contributing factor to the continued loss of total ozone in the Antarctic spring in 1984 and 1985. (Auth.)

I-34975

McCormick, M.P., Larsen, J.C., **Antarctic springtime measurements of ozone, nitrogen dioxide, and aerosol extinction by SAM II, SAGE, and SAGE II,** *Geophysical research letters,* Nov. 1986 13(12), p.1280-1283, 11 refs.

Simultaneous vertical profiles of O3, NO2 and aerosol extinction obtained with the Stratospheric Aerosol Measurement II (SAM II), Stratospheric Aerosol and Gas Experiment (SAGE), and SAGE II satellite instruments across the southern polar vortex show that significant differences exist at all altitudes. Both gaseous species display lower concentrations within the vortex over measurement altitudes ranging from the tropopause to 60 km and 20 to 40 km for O3 and NO2, respectively. Aerosol extinction above 15-18 km and total aerosol stratospheric column are also lower inside the vortex than outside. Total column amounts of O3 and NO2 are found to be strongly coupled to spatial location within the vortex, with minimum total values located around the vortex center. Vertical profiles selected to emphasize the observed difference across the circumpolar vortex are presented for Oct. 13, 1981, and Oct. 13, 1985, near 70 and 68 S latitude, respectively. (Auth.)

I-34976

Toon, O.B., Hamill, P., Turco, R.P., Pinto, J., **Condensation of HNO3 and HCl in the winter polar stratospheres,** *Geophysical research letters,* Nov. 1986 13(12), p.1284-1287, 18 refs.

Nitric acid and hydrochloric acid vapors may condense in the winter polar stratospheres. Nitric acid clouds, unlike water ice clouds, would form at the temperatures at which polar stratospheric clouds (PSCs) are observed and would have optical depths of the magnitude observed suggesting that HNO3 is a dominant component of PSCs. ClO, N2O5 and ClNO3 may react on cloud particle surfaces yielding additional HNO3, HCl, and HOCl. In the vicinity of PSCs these reactions could deplete the stratosphere of photochemically active NOx species. The sedimentation of PSCs may remove these materials from the stratosphere. The loss of vapor phase NOx might allow halogen-based chemistry to create the ozone hole. (Auth.)

I-34977

Hamill, P., Toon, O.B., Turco, R.P., **Characteristics of polar stratospheric clouds during the formation of the antarctic ozone hole,** *Geophysical research letters,* Nov. 1986 13(12), p.1288-1291, 14 refs.

Measured properties of antarctic polar stratospheric clouds are described and the possible relationship between the clouds and the formation of the ozone hole is considered. It is shown that the ozone hole develops and the clouds dissipate in the same place and at the same time. There may be a causal relationship between cloud particle evaporation and ozone depletion. A heterogeneous mechanism involving chemical reactions in the cloud droplets is suggested. (Auth.)

I-34978

Rodriguez, J.M., Ko, M.K.W., Sze, N.D., **Chlorine chemistry in the antarctic stratosphere: impact of OClO and Cl2O2 and implications for observations,** *Geophysical research letters,* Nov. 1986 13(12), p.1292-1295, 20 refs.

Theories have been proposed to relate the reduction of O3 during antarctic spring to catalytic cycles involving chlorine and bromine species. A necessary condition for any chlorine-catalyzed scheme is that a large fraction of the chlorine must be in the form of ClO in the lower stratosphere. It has been suggested that these high levels of ClO could be maintained by fast heterogeneous reactions, whose rates are not known at present. Model calculations based on the above mechanisms predict considerable amounts of OClO and Cl2O2, particularly during the night. Results of calculations of the diurnal variations of ClO, OClO, and Cl2O2 during antarctic spring, for different cases, are presented, which suggest that coincident measurements of the total column abundance and diurnal variation of ClO and OClO may help constrain key aspects of the proposed chemical mechanisms. Removal of O3 by the catalytic cycle involving Cl2O2 could be as important as that involving BrO for present levels of chlorine, provided that Cl2O2 photolyzes rapidly to yield Cl and ClO2. It is shown

that there is no synergy between these two cycles, since they both compete for the available ClO. (Auth. mod.)

I-34979

McElroy, M.B., Salawitch, R.J., Wofsy, S.C., **Antarctic O3: chemical mechanism for the spring decrease,** *Geophysical research letters,* Nov. 1986 13(12), p.1296-1299, 21 refs.

Chemical explanations for the spring decline of Antarctic O3 involve reactions of ClO or interactions between BrO and ClO. Reaction schemes involving Br radicals have the highest efficiency for removal of O3. The chemical mechanisms require low levels of NOx. Recent cooling of the stratosphere may have triggered formation of HNO3 monohydrate, removing NOx and setting the stage for enhanced loss of ozone over Antarctica. (Auth.)

I-34980

Aikin, A.C., McPeters, R.D., **Meteoric material and the behavior of upper stratospheric polar ozone,** *Geophysical research letters,* Nov. 1986 13(12), p.1300-1303, 12 refs.

During spring of 1983 at 75 to 80 S the ozone mixing ratio at 1 mb decreases continuously from Sep. through the summer solstice and then increases in late summer and fall, but much less ozone was observed at 1 mb in Sep. and Oct. than under similar conditions in the fall. This asymmetry between spring and fall ozone values may be the direct result of the sudden release of chlorine bound by meteoric material during polar night. Meteoric atoms, X, descending from the mesosphere react with the atmosphere to produce XOH, which will interact with HCl to form salts, XCl. Since these processes continue in the absence of sunlight, chlorine may accumulate during polar winter. The sudden release of this chlorine from photodissociation of these salts during spring could give rise to the loss of ozone in the upper stratosphere. At 30 mb ozone decreases substantially in mid-Sep. and remains at a low value until the mid-Oct. increase. Different mechanisms may be required to explain the ozone decreases in the upper stratosphere and in the lower stratosphere. (Auth.)

I-34981

Cariolle, D., Déqué, M., Morcrette, J.-J., **GCM simulation of the ozone seasonal variations at high latitudes in the Southern Hemisphere,** *Geophysical research letters,* Nov. 1986 13(12), p.1304-1307, 15 refs.

A General Circulation Model is used to simulate the O3 seasonal variations in the Southern Hemisphere at high latitudes. The model reproduces many features of the stratospheric circulation and the ozone distribution. In particular a very cold and intense polar vortex develops from mid-winter through spring and lasts until early Nov. The ozone content is minimum in the polar vortex, below 300 Dobsons, in spring. This value is still significantly higher than the amounts near 200 Dobsons recently measured in several Dobson stations in Antarctica. The possible deficiencies of the model photochemistry responsible for this discrepancy are discussed. The rapid polar ozone increase which follows the final warming is fairly well reproduced by the model. The warming starts in early Nov. and is associated with an increase of the planetary wave 1 amplitude beyond 60 S. The polar vortex follows a westward trajectory which starts from the pole and crosses over the Argentine Is. before vanishing at midlatitudes, in good agreement with observations. (Auth.)

I-34982

Tung, K.K., **On the relationship between the thermal structure of the stratosphere and the seasonal distribution of ozone,** *Geophysical research letters,* Nov. 1986 13(12), p.1308-1311, 12 refs.

An attempt is made to put the phenomenon of antarctic ozone hole in a global perspective by pointing out that there is a much larger and more persistent hole over the tropics. The thermal structure of the antarctic lower stratosphere in winter is more similar to the tropical lower stratosphere than the Arctic lower stratosphere in winter. The dynamical transport that is responsible for creating the two column ozone minima has similar relationship to the thermal structure in the lower stratosphere in the two regions. (Auth.)

I-34983

Yamazaki, K., **Preliminary calculation of trajectory analysis in the lower stratosphere of the Southern Hemisphere,** *Geophysical research letters,* Nov. 1986 13(12), p.1312-1315, 5 refs.

A trajectory analysis of air parcels for the Southern Hemisphere winter is performed with observed data. A low-dispersive region exists around 60 S and poleward in the lower stratosphere. This feature is probably related to the low ozone density over Antarctica in winter. (Auth.)

I-34984

Mahlman, J.D., Fels, S.B., **Antarctic ozone decreases: a dynamical cause?,** *Geophysical research letters,* Nov. 1986 13(12), p.1316-1319, 11 refs.

A hypothesis is advanced that natural dynamical processes might explain much of the observed late winter ozone decreases over Antarctica. For this to be the case, sometime after 1979 there must have been a substantial reduction of the wintertime planetary-scale disturbance activity in the Southern Hemisphere troposphere. The expected stratospheric response to such a natural process is to reduce wintertime polar ozone, prolong the life of the polar vortex, reduce the transport of ozone put out of the middle stratosphere, and increase the possibility of polar rising motion shortly after the return of the sun to high latitudes. All of these effects are in qualitative agreement with the observed ozone changes. (Auth.)

I-34985

Pyle, J.A., **Large ozone losses in Antarctica: the role of heating perturbations,** *Geophysical research letters,* Nov. 1986 13(12), p.1320-1322, 9 refs.

Using a two-dimensional circulation model the possible influence on the polar ozone column of modifications to lower stratospheric heating rates, both within the polar vortex and in middle latitudes, has been examined. Using reasonable heating rates it is not possible to change the model ozone to reproduce observed ozone losses in Antarctica. If an additional model heating is introduced at, or just before, the end of the Southern Hemisphere polar night, the time scales are such that appreciable ozone changes do not occur for at least three months. (Auth.)

I-34986

Evans, W.F.J., Boville, B.W., McConnell, J.C., Henderson, G.S., **Simulation of antarctic ozone with chemical and dynamical effects,** *Geophysical research letters,* Nov. 1986 13(12), p.1323-1326, 16 refs.

Several numerical 1-D model experiments were conducted in an attempt to simulate the behavior of antarctic O3 throughout the year and in particular to account for the observed downward trend of O3 in Oct. The vertical and horizontal transports were parameterized by a vertical formulation. It is found that the observed low Oct. O3 can be simulated by an increase in the intensity of the vertical transport in the polar night and early spring or by a delay in the transition from the winter to summer thermal regimes. In addition, the effect of atmospheric transports on the total O3 is shown to be important throughout the year. It is suggested that dynamical changes in the winter vortex, possibly caused by stratospheric cooling due to the greenhouse effect, may be even more important than photochemical changes in the striking enhancement of the antarctic O3 hole. (Auth.)

I-34987
Isaksen, I.S.A., Stordal, F., **Antarctic ozone depletion: 2-D model studies,** *Geophysical research letters,* Nov. 1986 13(12), p.1327-1330, 12 refs.

Antarctic ozone depletion is estimated in a 2-D global model as a result of increase in chlorine levels from 1 ppb to 2.7 ppb and an increase in bromine levels from 15 ppt to 30 ppt. The adopted increase is assumed to be the anthropogenic influence on the stratospheric concentrations of chlorine and bromine species in 1985. Heterogeneous formation of ClO from the reaction between ClONO2 and HCl is included in the calculations, hypothesizing this is the dominant reaction path for chlorinated species on particle surfaces. A total ozone depletion as high as 14-20% may have occurred during the month of Oct. at 80 S when maximum depletion is obtained. Both the magnitude and the time period when the maximum depletion occurs, agree with observed depletion over the last 8 years. (Auth.)

I-34988
Shine, K.P., **On the modelled thermal response of the antarctic stratosphere to a depletion of ozone,** *Geophysical research letters,* Nov. 1986 13(12), p.1331-1334, 14 refs.

Simple models are used to investigate the effect of a spring-time depletion of ozone in the Antarctic on stratospheric temperatures It is shown that coolings in excess of 5 K are possible in the lower stratosphere. No evidence for such changes exists. One possible mechanism that could offset this cooling involves the loss of water vapor from the lower stratosphere due to desiccation processes associated with polar stratospheric clouds. (Auth.)

I-34989
Shi, G., Wang, W.-C., Ko, M.K.W., Tanaka, M., **Radiative heating due to stratospheric aerosols over Antarctica,** *Geophysical research letters,* Nov. 1986 13(12), p.1335-1338, 18 refs.

The 1982 balloon measurements of temperature, ozone, humidity, and ground-based measurements of turbidity at Showa Station are used to study the solar and thermal radiative effects due to gases and aerosols. Calculations indicate that, with the observed temperature, the thermal radiative cooling due to CO2 and O3 emissions yield a net radiative cooling in the lower stratosphere throughout the year, if the effects of aerosols are excluded. The aerosols play an important role in the long-wave radiation by providing a thermal heating from Mar. to Sep. During the winter months the thermal heating almost compensates for the cooling due to CO2 and O3 emissions resulting in a near radiative equilibrium state. This sets the stage for a net radiative warming in spring from absorption of solar energy, which may provide energy for an upwelling motion responsible for the ozone hole. (Auth.)

I-34990
Rosenfield, J.E., Schoeberl, M.R., **Computation of stratospheric heating rates and the diabatic circulation for the antarctic spring,** *Geophysical research letters,* Nov. 1986 13(12), p.1339-1342, 13 refs.

A radiative transfer model is used to compute the net heating and diabatic circulation from observed temperature and ozone data in the Southern Hemisphere during Sep. and Oct. of 1979, 1980, and 1984. There is an increase in net heating near the pole which is associated with an upward cell in the diabatic circulation. This is consistent with dynamical theories of the observed intraseasonal changes in total ozone which postulate the development of an upward circulation at the pole. However, estimates of the mass circulation at the pole suggest that an additional heat source of at least 0.5 K/day is required to maintain the upward cell. Increased net heating at the pole from 1979 to 1980 and decreased net cooling at mid to subpolar latitudes from 1979 to 1984 is also found, which suggests a trend toward increased upward circulation at the poles and downward motion at midlatitudes consistent with the observed changes in total ozone. (Auth.)

I-34991
Hatakeyama, S., Leu, M.-T., **Reactions of chlorine nitrate with HCl and H2O,** *Geophysical research letters,* Nov. 1986 13(12), p.1343-1346, 13 refs.

The kinetics of the reactions of chlorine nitrate with HCl and H2O have been investigated using a static photolysis/Fourier transform infrared spectrophotometer apparatus. Upper limits for the rate constants for the homogeneous gas-phase reactions of ClONO2+HCl (1) and ClONO2+H2O (2) were estimated. The yields of HNO3 were 1.05 and 0.86, respectively. No synergistic effect between H2O and HCl was observed. The kinetic behavior of reaction (2) was well described by simple first-order kinetics while the behavior of reaction (1) was found to be well described in terms of the Langmuir adsorption isotherm. (Auth. mod.)

I-34992
Hayman, G.D., Davies, J.M., Cox, R.A., **Kinetics of the reaction ClO+ClO—>products and its potential relevance to antarctic ozone,** *Geophysical research letters,* Nov. 1986 13(12), p.1347-1350, 18 refs.

Reaction ClO+ClO—>products has been studied by a molecular modulation technique as a function of temperature from 268 to 338 K using pressures from 2 to 700 Torr. The reaction is found to have a strong pressure dependence and to be second order under the conditions used. The data have been interpreted in terms of three pressure-independent channels and a fourth, pressure-dependent channel in which the ClO dimer is formed. The title reaction is then discussed in the light of the large ozone depletions seen in the antarctic spring. A catalytic cycle involving the ClO dimer is presented which may account for these observations. (Auth. mod.)

I-34993
Friedl, R.R., Goble, J.H., Sander, S.P., **Kinetics study of the homogeneous and heterogeneous components of the HCl + ClONO2 reaction,** *Geophysical research letters,* Nov. 1986 13(12), p.1351-1354, 11 refs.

The kinetics of the reaction HCl+ClONO2—>Cl2+HNO3 were investigated at 298 K using a flow reactor with FTIR analysis to assess the importance of this reaction for stratospheric chemistry. The observed reaction was characteristic of a heterogeneous process. From calculations of the first order wall rate constant, estimates were made of the reaction rate on stratospheric aerosols. Because both HCl and ClONO2 need to be adsorbed on the particle surface, the reaction will be of negligible importance under most stratospheric conditions. (Auth. mod.)

I-34994
Fleig, A.J., Bhartia, P.K., Wellemeyer, C.G., Silberstein, D.S., **Seven years of total ozone from the TOMS instrument: a report on data quality,** *Geophysical research letters,* Nov. 1986 13(12), p.1355-1358, 7 refs.

Seven years of TOMS total ozone data are currently available. Recently a new ozone retrieval algorithm based on improved ozone absorption cross section was implemented that has introduced 6-7% discontinuity in the archived data sets at the end of the 5th year of instrument operation. Until all data are reprocessed with the new algorithm, users can use a table of correction factors given in this paper to make the data set internally consistent. This paper also presents a comparison of TOMS results with Amundsen Scott Dobson station. Though the agreement in most years is good, in 1983-84 the Dobson station reported unusually high values of ozone while TOMS saw the very low ozone values associated with the antarctic ozone hole. (Auth.)

I-34995
Fleig, A.J., Bhartia, P.K., Silberstein, D.S., **Assessment of the long-term drift in SBUV total ozone data, based on comparison with the Dobson network,** *Geophysical research letters,* Nov. 1986 13(12), p.1359-1362, 6 refs.

Six years of total ozone data derived from the SBUV instrument on Nimbus 7 are compared with results from 41 Dobson stations. Results indicate that the SBUV measurements have drifted against the Dobson stations with a roughly linear trend of .38% per year. Several possible reasons for this relative drift are discussed. (Auth.)

I-35030
Kodama, Y., Wendler, G., **Wind and temperature regime along the slope of Adelie Land, Antarctica,** *Journal of geophysical research,* May 20, 1986 19(D6), p.6735-6741, 26 refs.

An analysis was made of data collected from automatic weather stations (AWS) on the slope of Adelie Land. The data were collected simultaneously at different stations on the ice-covered slope of the continent, where no data have previously been obtained. The stations are classified into three groups according to their location (high plateau, intermediate plateau, or coastal region), each having distinct annual temperature and wind speed regimes. These classifications also correspond well to the stations' slopes. Change in surface air temperature along the slope with respect to height was smaller than -1 deg C/100 m between the high plateau and the intermediate plateau stations. The wind directions did not follow Ball's model, which suggests the importance of the gradient of surface potential air temperature along the slope on the wind regime. A scale analysis showed the condition in which the gradient of surface potential air temperature along the slope should not be considered negligible when considering the total pressure gradient force. This condition in turn indicates that the entrainment of momentum across the top of the katabatic wind layer is also important. (Auth.)

I-35046
Oeschger, H., Stauffer, B., **Review of the history of atmospheric CO2 recorded in ice cores,** Changing carbon cycle: a global analysis, New York, Springer-Verlag, 1986, p.89-108, 38 refs.

DLC QH344.C46 1986

For the past 25 years the study of ice cores for potential insights into the history of the atmosperic CO2 concentration has received great attention from scientists interested in the reconstruction of environmental parameters. Deep ice cores from Greenland and Antarctica, which are continuous sequences of generally high-quality samples formed during the last 100,000 and 50,000 years, respectively, were available for study. Research has led to new techniques for extracting gases from ice and to recent developments of sensitive and accurate techniques for the analysis of gas. In this chapter the state of the art of this research is described. A crucial question relates to the occlusion of air in ice and to possible mechanisms leading to deviations of the gas composition of the trapped air from that of the atmosphere at the time of ice formation and during the long storage time of the air bubbles in the surrounding ice matrix. In examining these processes some of the significant factors considered are: history of the method of reconstructing atmospheric gas composition; trapping of air in natural ice; interactions between air in bubbles and surrounding ice; preindustrial atmospheric ice; CO2 sources and sinks and CO2 warming; natural regulation of atmospheric CO2 concentration; climate impact of past atmospheric CO2; and isotopic CO2 variations. (Auth. mod.)

I-35058
Lejenäs, H., **Comparative study of Southern Hemisphere blocking during the Global Weather Experiment,** *Royal Meteorological Society, London. Quarterly journal,* Jan. 1987 113(475), p.181-188, 11 refs.

Southern Hemisphere blocking during the Global Weather Experiment has been studied. Two different data sets, and two different methods to identify blocking have been used. One data set consists of maps analyzed at the Australian Bureau of Meteorology and the other of FGGE level III-b data. The results show that one method, which tends to emphasize blocks accompanied by cut-off lows, is more sensitive to data accuracy than the other which is based on a count of persistent positive anomalies exceeding a certain threshold value. Antarctic data was analyzed in preparing the model for this study. (Auth.)

I-35071
Lysakov, E.P., **Atmospheric circulation monitoring in the Antarctic. Objectives, and ways of problem solving** [Monitoring atmosfernoĭ tsirkuliatsii v Antarktike. Tseli i puti resheniia problemy], *Antarktika; doklady komissii,* 1984 No.23, p.5-14, In Russian. 13 refs.

DLC G576.A65

Presented are some correlations of observations and long-term assessment of atmospheric circulation on isobaric surfaces from ground to 30 gp, as well as results of operational tracking and calculation of the development of processes at intervals of 6 hours. Preliminary results of the experiment, showing the interrelationship between the cloud cover and circulation intensity, are evaluated based on the latter's variations of quantitative indexes.

I-35072
Lysakov, E.P., Sveshnikov, A.M., **Energy estimation of atmospheric circulation over the southern ocean** [Energeticheskaia otsenka atmosfernoĭ tsirkuliatsii nad IUzhnym okeanom], *Antarktika; doklady komissii,* 1984 No.23, p.15-21, In Russian. 1 ref.

DLC G576.A65

Mean energy fields for the totality of atmospheric processes over the southern ocean were obtained, and assessments of the fluctuation of energy content in the troposphere, related to cyclonic eddies and atmospheric fronts, are presented. It is shown that variations in the field of latent heat reach their highest values in the lower troposphere. It is observed that the field adaptation of all types of energy in atmospheric disturbances relates to the intensity of barometric formations.

I-35073
Koshel'kov, IU.P., **Revised empirical models of the stratosphere and mesosphere of the Southern Hemisphere** [Utochnennye empiricheskie modeli stratosfery i mezosfery iuzhnogo polushariia], *Antarktika; doklady komissii,* 1984 No.23, p.22-34, In Russian. 17 refs.

DLC G576.A65

Review of radiosonde and temperature rocket data obtained up to Jan. 1982 resulted in corrected empirical models of the Southern Hemisphere atmosphere, for the 25-80 km layer, which are discussed. Tabulated temperature and wind velocity values show little difference in the stratosphere between the new and the previously obtained models. In the mesosphere, however, the temperature values differ by up to 5-7 deg, and those for the wind speed by 5-10 m/s. A comparison is made with the Northern Hemisphere data, and interhemispheric differences are determined on the basis of the corrected models.

I-35074
Kovshova, E.N., **Temperature fields in the mesosphere and regional models of the atmosphere for the Southern Hemisphere** [Polia temperatury v mezosfere i regional'nye modeli atmosfery dlia iuzhnogo polushariia], *Antarktika; doklady komissii,* 1984 No.23, p.35-40, In Russian. 7 refs.
DLC G576.A65

Satellite data show a significant asymmetry of temperature fields in the stratosphere and mesosphere of the Southern Hemisphere in the cold period. The consistency of such anomalies makes it necessary to complement general models of the Southern Hemisphere atmosphere with regional ones. Mean temperature profiles for some sectors of the Southern Hemisphere, based on satellite data obtained during a period of 2-3 years, are presented, complementing general models based on rocket data. Stratospheric and mesospheric temperature differences between sectors are discussed.

I-35098
Chiba, O., Kobayashi, S., **Study of the structure of low-level katabatic winds at Mizuho Station, East Antarctica,** *Boundary-layer meteorology,* Dec. 1986 37(4), p.343-355, 14 refs.

Low-level katabatic wind profiles, which have shapes similar to those of the low-level jet (LLJ) wind profiles, are often observed during strong winds in the summer period at Mizuho Station. The profiles may be classified according to the height of the maximum wind speed zm, found below 30 m height. The behavior of zm and of conditions in the layer above zm are explained well by the normalized frequency, $fN=Nz/U$ at 30 m, whose value can be used to predict the existence of a LLJ wind profile. Subsidence and inertial oscillations above zm are related closely to the height and time variations of zm. Thus, not only effects emanating upward from surface but also momentum and heat transported downward from above are significant for the evolution of zm. (Auth.)

I-35114
Shaw, G.E., **On physical properties of aerosol at Ross Island, Antarctica,** *Journal of aerosol science,* 1986 17(6), p.937-945, 15 refs.

The physical characteristics of Aitken nuclei and their relation to air mass type at Ross Island are reported. The size distribution spectrum of the particles was derived with a diffusion battery and nonlinear mathematical inversion and is considered to be quite accurate over the particle diameter range $0.01<d<0.2$ micron. The Aitken nuclei concentration decreased at Ross Island by about an order of magnitude from summer to winter. Particle size varied with air mass type: maritime polar air masses had a geometric mean particle diameter larger than continental Antarctic (cA) air masse particles. The anomalously small particles associated with cA air suggests the presence of an upper tropospheric or partly stratospheric origin of nuclei perhaps associated with mixing formed by breaking waves over the Ellsworth Range in Marie Byrd Land. (Auth.)

I-35119
Iwasaka, Y., **Non-spherical particles in the antarctic polar stratosphere—increase in particulate content and stratospheric water vapor budget,** *Tellus,* Nov. 1986 38B(5), p.364-374, 28 refs.

The back-scattering coefficient and depolarization ratio of antarctic stratospheric aerosols were observed by a lidar at Showa Station in 1983 to gather data on the nature of polar stratospheric aerosols. A balloon measurement was also made to determine the concentration of the particles. The balloon data showed a large concentration of particles with radius larger than 0.15 micron (15 particles/cu cm in the lower stratosphere) and a size distribution which was rich in smaller size particles. During early June, the back-scattering coefficient rapidly increased, but the depolarization ratio was at a low level. After mid-June, the depolarization ratio increased as the winter progressed, and this suggests that most of the stratospheric particles had non-spherical shapes (possibly ice crystal particles) in mid-winter. The lidar measurement showed that the stratospheric particles layer was transported downward at the rate of 0.8 mm/s during winter. The mass of water transported from the stratosphere to the troposphere is estimated to be about 50 million tons per winter season if we assume that the settling rate of the layer is due to gravitational sedimentation of ice crystal particles. If it is due to downward air motion carrying smaller crystals, this is reduced to 50 thousand tons. (Auth. mod.)

I-35126
Margitan, J.J., **Causes and effects of a hole,** *Nature,* Jan. 22-28, 1987 325(6102), p.297-298, 5 refs.

The cause and significance of the antarctic ozone hole are discussed, as are the preliminary results from the U.S. National Ozone Expedition (NOZE) to McMurdo Station. The NOZE ozonesonde measurements showed significant vertical structure to the hole, with 80% depletion in some of the 1-km layers but only 20% in adjacent layers. The depletion was confined to the 12-20-km region, beginning first at the higher altitude and progressing downwards. The microwave instrument produced data on hydrogen cyanide, ClO and nitrous oxide, which show unusually low concentrations within the vortex. Measurements of aerosol particle densities show an upward transport. The tentative conclusion of the NOZE team is that there is strong evidence against the solar activity theory and some evidence against the dynamical theory, favoring a chemical mechanism as the most likely cause of ozone depletion in the hole.

I-35135
Portniagin, IU.I., Solov'eva, T.V., **High-latitude structure of the temperature field in the mesopause-lower thermosphere region,** *Geomagnetism and aeronomy,* 1984 24(1), p.126-128, 6 refs., Translated from Geomagnetizm i aeronomiia.
DLC QC811.G383

The temperature fields found for the Southern Hemisphere show that a cold summer and a warm winter are typical of the high-latitude mesopause of both Northern and Southern Hemispheres. The height of the mesopause changes as a function of latitude and season. Thus, the minimum height of the mesopause (about 84 km) is observed in January at high latitudes of the Northern Hemisphere, the maximum height of about 90 km at low latitudes and the intermediate height of about 88 km at high latitudes in the Southern Hemisphere. A certain analogy with respect to January is noted in the height change of the mesopause as a function of latitude during July for the respective seasons: minimum height about 82 km is characteristic of high latitudes of the winter (i.e., southern) hemisphere; maximum height about 90-92 km in the lower latitudes and intermediate height about 84 km in the high latitudes of the summer hemisphere. The height-latitude temperature profiles plotted from the calculations for the periods of the solstices (January (a) and July (b)) and for the equinox periods (April (a) and October (b)) are shown.

I-35199
Stauffer, B., **Composition of ancient atmosphere, based on ice-core analyses,** *Antarctic journal of the United States,* 1985 20(5), p.72-73, 7 refs.

Air entrapped in bubbles of cold ice has essentially the same composition as the atmosphere at the time of bubble formation. The main purpose of this investigation is to determine the age of the enclosed gas and to analyze the air extracted from ice samples of different age. Based on such measurements, the history of the atmospheric composition, especially the history of the carbon dioxide and

methane concentrations, can be reconstructed. Details of the field work and laboratory analyses conducted during 1983-1985 are provided.

I-35205
Matveev, IU.L., Matveev, L.T., Soldatenko, S.A., **Global cloud field** [Global'noe pole oblachnosti], Leningrad, Gidrometeoizdat, 1986, 280p., In Russian with English summary. 355 refs.

Statistical analysis, parameterization and simulation of global cloud field has been performed on the basis of satellite data obtained for 1966-1980. The mean values, standards, coefficients of asymmetry and excess of cloud amount are analyzed at different time intervals and for different squares, with values averaged for the Earth as a whole and the latitudes, hemispheres, water and land areas, and every ocean and continent, including the antarctic region. Also, density of distribution, correlational and spectral functions of cloud amount are constructed and analyzed. Annual variations and geographic peculiarities of cloud distribution for the Earth as a whole have been investigated, and differences between the northern and southern hemispheres are discussed. It is shown that atmospheric dynamics plays an important role in the formation and evolution of cloud field; in its turn it is also in close connection with thermal inhomogeneity and advection (horizontal baroclinicity). (Auth. mod.)

I-35209
Tezuka, M., Satoh, M., Sakuma, K., Mabuchi, K., **Meteorological observations at Syowa Station in 1981 by the Japanese Antarctic Research Expedition,** *Antarctic record,* Nov. 1986 30(3), p.189-218, In Japanese with English summary and captions. 8 refs.

This paper describes the results of meteorological observations carried out by JARE-22 at Showa Station from 1 Feb. 1981 to 31 Jan. 1982. The surface and upper air data were automatically processed by using the entire Automated Meteorological Observation System (AMOS) for the first time. Problems occurred in disk equipment of the system in Sep. 1981. Since then, the upper air observations had to be made in the same way as before JARE-20. The methods of the other observations and data statistics are almost the same as JARE-21. A new type instrument screen and CVCF (Constant Voltage & Frequency) were installed. This paper also describes the results of the experiment of special analysis of the upper air observations. (Auth.)

I-35210
Kanzawa, H., **Report on the MT-135JA meteorological rocket experiment (JARE-26),** *Antarctic record,* Nov. 1986 30(3), p.219-245, In Japanese with English summary and captions. 19 refs.

The report outlines the operational aspects of the meteorological rocket MT-135JA experiments performed first at Showa Station in 1985. Also described are the development of the MT-135JA rocket and the other preparations in Japan, transport of the rockets from Japan to Showa Station, construction of an MT-135JA rocket launcher as one of the projects in the summer operation of JARE-26, progress in the rocket experiment, operations at the time of the rocket launches and outlines of the results of the flight experiment in its operational aspects. Scientific results of the experiment will be published in other scientific journals. (Auth. mod.)

I-35243
Hofmann, D.J., Harder, J.W., Rolf, S.R., Rosen, J.M., **Balloon-borne observations of the development and vertical structure of the antarctic ozone hole in 1986,** *Nature,* Mar. 5-11, 1987 326(6108), p.59-62, 11 refs.

The vertical distribution of ozone is described, which was measured at McMurdo Station using balloon borne sensors, on 33 occasions, during the period Aug. 25-Nov.6, 1986. These observations suggest a highly structured cavity confined to the 12-20 km altitude region. In the 17-19 km altitude range, the ozone volume mixing ratio declined from about 2 p.p.m. at the end of Aug. to about 0.5 p.p.m. by mid-Oct. The average decay in this region can be described as exponential with a half life of about 25 days. While total ozone, as obtained from profile integration, declined only about 35%, the integrated ozone between 14 and 18 km declined more than 70%. Vertical ozone profiles in the vortex revealed unusual structure with major features from 1 to 5 km thick which had suffered ozone depletions as great as 90%. (Auth.)

I-35248
Carroll, J.J., **Processes determining regional thermal and precipitation climatology,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.493-497, 9 refs.

Climate is the resultant of many events. This discussion focuses on the processes which determine the average temperature and precipitation in a region, as these are the key variables determining glacial advance or retreat. The subject is developed by exploring simple energy budget models of thermal climate, followed by a discussion of the processes controlling precipitation. (Auth.)

I-35280
Belitz, H.-J., Kottmeier, C., **Meteorological research using a high mast on an antarctic shelf,** *Marine technology,* Mar. 1987 18(1), p.5-10, In English with German summary and figure captions. 13 refs.

In January 1983 a meteorological mast, 45 m in height, was erected at Georg von Neumayer Station to study processes in the atmospheric boundary layer. The scientific objectives and the layout of the measuring system are presented and it is shown how the basic difficulties in founding and erecting the mast were overcome. The investigation of two specific processes is described in order to demonstrate the capabilities of the measuring system. (Auth.)

I-35281
Iwasaka, Y., Ono, T., Nonura, A., **Changes in aerosol content and temperature in the antarctic spring stratosphere: lidar measurement at Syowa Station (69 deg S, 39 deg 35'E) in 1983, 1984 and 1985,** *Geophysical research letters,* Dec. 1986 13(13), p.1407-1410, 15 refs.

Measurements of stratospheric aerosols by means of a lidar system are described. The year-to-year changes in aerosol content were influenced by volcanic eruption of Mt. El Chichon (spring 1982, Mexico) and variations of stratospheric temperature. The aerosol load in winter of 1983 was about five times larger than the load of 1985. The particle content of spring 1985 was larger than that of spring 1983 even though the effect of the volcanic eruption was more severe in 1983. This may be a result of the decrease in average stratospheric temperature in spring. If heterogeneous reactions including the particles are indeed important for antarctic ozone depletion, the rate of ozone depletion from heterogeneous reactions in the antarctic spring must have increased from 1983 to 1985. (Auth.)

I-35295
Keys, J.G., Johnston, P.V., Matthews, W.A., **Antarctic "ozone hole" phenomenon: some aspects of related New Zealand research,** *New Zealand antarctic record,* 1986 7(2), p.1-4, 8 refs.

One of the major discussion topics in the atmospheric sciences during 1986 has been the identification of the "ozone hole" at south-

ern high latitudes—a region where stratospheric ozone has been shown to be steadily declining, perhaps for a decade. Superimposed on this steady fall is an additional rapid drop and subsequent partial recovery each spring. Various theories have been advanced to explain the phenomenon. Here the problem is outlined and some aspects where the present New Zealand research effort is targeted are discussed, in particular the measurements at Arrival Heights.

I-35311

Arias E., L., **Ozone in Antarctica** [El ozono en la Antártica], *Boletín Antártico Chileno,* July-Dec. 1986 6(2), p.39-53, In Spanish. 9 refs.

Background information on the formation, appearance, odor, chemical properties and world distribution of ozone is given and possible explanations, chemical and dynamic, for its depletion over Antarctica are examined. Various research programs in connection with this subject, particularly those coordinated by NASA, are mentioned, with the conclusion that only an interdisciplinary effort—mainly by chemists, physicists and meteorologists working together—will lead to an understanding of this problem.

I-35319

Laurent, J., **Middle atmospheric water vapor observed by the *Spacelab one* grille spectrometer,** *Planetary and space science,* Nov. 1986 34(11), p.1067-1071, 30 refs.

Two water vapor atmospheric concentration profiles have been obtained, one 33 N, 59 E and the other at 68 S, 124 W, during the *Spacelab One* flight respectively on Dec. 1 and 2, 1983. These profiles extend from the middle stratosphere up to mesopause and show significant differences above the altitude of 70 km, the antarctic profile showing then higher concentrations. This result correlates with *Spacelab One* carbon monoxide observations and SME ozone results as far as the hydroxyl radical chemistry is concerned. (Auth.)

I-35328

Saari, M.R., Yuen, D.A., Schubert, G., **Climatic warming and basal melting of large ice sheets: possible complications for East Antarctica,** *Geophysical research letters,* Jan. 1987 14(1), p.33-36, 23 refs.

Climatic warming is shown to be capable of inducing shear heating instability and basal melting in a model ice sheet that is creeping slowly downslope. Growth times of the instability are calculated from a nonlinear analysis of temperature and flow in the model ice sheet whose surface undergoes a prescribed increase of temperature. The source of instability lies in the decrease of maximum ice thickness for steady downslope creep with increasing surface temperature. A surface temperature increase of 5 to 10 K can cause instability on a 10,000 year time scale for realistic ice rheology. The instability occurs suddenly after a prolonged period of dormancy. The instability might be relevant to the East Antarctic ice sheet. Warming associated with the Holocene interglacial epoch that heralded the end of the last ice age may have set the East Antarctic ice sheet on a course toward widespread instability some 10,000 years later. The present CO2-induced climate warming is also a potential trigger for instability and basal melting of the East Antarctic ice sheet. (Auth.)

I-35329

Gernandt, H., **Vertical ozone distribution above the GDR-research base, Antarctica, in 1985,** *Geophysical research letters,* Jan. 1987 14(1), p.84-86, 2 refs.

Results of balloon borne soundings with electrochemical ozone sondes carried out at 70.8 S; 11.9 E are discussed. During polar spring in 1985 the high time resolution of soundings (about 12 launches per month) gives a detailed picture on the vertical distribution and height variations of different maxima of ozone partial pressure near the margin of the ozone hole crossing the continental coast above Queen Maud Land in recent time. (Auth.)

I-35330

Iwasaka, Y., Kondoh, K., **Depletion of antarctic ozone: height of ozone loss region and its temporal changes,** *Geophysical research letters,* Jan. 1987 14(1), p.87-90, 5 refs.

Ozonosonde measurements at Showa Station from 1971 to 1984 show that ozone depletion is most striking in the region 10 km to 25 km in the last five years. The active ozone loss region in the spring shows good correspondence to the region where a noticeable drop in stratospheric temperature is observed from 1981 to 1985, but only in the spring. Monthly averaged lower-stratospheric temperature decreased smoothly from about 1975 to the present in the spring. The temperatures in October and November 1985 are comparable to the frost point temperature of water vapor with 10 ppmv mixing ratio at about 100 mb. The temperature drops observed in interannual trends could activate formation of ice particles, and cause noticeable ozone loss in the spring through heterogenous ozone reduction reactions. (Auth.)

I-35331

Nagatani, R.M., Miller, A.J., **Influence of lower stratospheric forcing on the October antarctic ozone decrease,** *Geophysical research letters,* Mar. 1987 14(3), p.202-205, 11 refs.

The vertical component of the Eliassen-Palm (E-P) fluxes for the seven Septembers of 1979 to 1985 are shown to have a pattern correlation to 30 mb mean latitudinal ozone and temperature at 70 S for October, suggesting a dynamical influence on the long term trend of ozone and temperature values in the Southern Hemisphere for the period. For the August E-P fluxes and September parameters the relationship still appears to hold for temperature, but the ozone relationship is much weaker. (Auth.)

I-35396

Barry, R.G., **Aspects of the meteorology of the seasonal sea ice zone,** NATO Advanced Study Institute on Air-Sea Interaction, Acquafredda di Maratea, Italy, Sep. 28-Oct. 10, 1981. Proceedings. Geophysics of sea ice. Edited by N. Untersteiner. NATO ASI series, Series B: Physics, Vol.146, New York, Plenum Press, 1986, p.993-1020, Refs. p.1013-1020.

A relationship is presented between the marginal ice zone and storm tracks. There is a parallelism observed in the Northern Hemisphere but the storm tracks are displaced 7 to 8 deg southward. In the Southern Hemisphere greater similarities are noted between the storm tracks and the location of the Antarctic Convergence Zone.

I-35415

Andreas, E.L., **Comment on "Atmospheric boundary layer modification in the marginal ice zone" by T.J. Bennett, Jr. and K. Hunkins,** *Journal of geophysical research,* Apr. 15, 1987 93(C4), p.3965-3969, Includes reply by Bennett and Hunkins. 19 refs. For the paper being critiqued see 41-1861 (I-34897) and for the Andreas et al paper which included the data used by Bennett and Hunkins, see 38-1819 (14I-29231).

Andreas briefly commends Bennett and Hunkins for an important contribution to MIZ research but points out numerous serious shortcomings in their methods, data interpretations, misrepresentations, misuse of mathematical equations, and a generally careless approach in the use of his data. In their reply, Bennett and Hunkins seem to agree that the criticism is justified.

I-35447

Egger, J., Fraedrich, K., **Topographic Rossby waves over Antarctica,** *Tellus,* Mar. 1987 39A(2), p.110-115, 10 refs.

The linear barotropic vorticity equation on an infinite polar *f*-plane is solved for free eigenmodes supported by the zonally averaged topography of Antarctica. Analytic solutions are derived for an exponential orographic profile. The structure and frequency of these topographic Rossby waves are discussed and compared to observations. (Auth.)

I-35458

Rowland, F.S., **Chlorofluorocarbons and the antarctic ozone hole,** *Environmental conservation,* Autumn 1986 13(3), p.193-194, 9 refs.

Measurements of chlorine compounds over Antarctica are to date very scarce, and attempted explanations for this loss of ozone are made in the absence of detailed experimental knowledge of the chemical composition of the antarctic stratosphere in Sep. and Oct. The present hypothesis is that heterogeneous reactions can occur during the cold antarctic night on the known polar stratospheric clouds (PSCs). One of these is the hydrolysis of N2O5 to form nitric acid, and a second is the hydrolysis of chlorine nitrate. A third possibility is the reaction of HCl with chlorine nitrate, although this would require very high particle-collision efficiencies. Measurements over Antarctica have already shown diminished NO2 concentrations in the spring, consistent with conversion of NO2 to N2O5 and then to HNO3. Because of the long lifetimes of chlorofluorocarbons, the antarctic ozone hole (and other possible temperature-latitude effects) may be expected to last for the entire 21st century.

I-35474

Beardmore, D.J., Pearman, G.I., **Atmospheric carbon dioxide measurements in the Australian region: data from surface observatories,** *Tellus,* Feb.-Apr. 1987 39B(1-2), p.42-66, 23 refs.

Observations of the atmospheric carbon dioxide concentration made at surface locations in the Australian and Antarctic regions are presented for the period 1976-1984. These observations complement those already reported which were based on samples collected from aircraft throughout the troposphere and lower stratosphere in the same region. Data are presented for 4 sites, Cape Grim (northwestern Tasmania), Mawson, Macquarie Island, and Wilbinga (Perth area), and for air samples collected on board ships traversing the southern ocean. Methods are considered for the selection of data to represent the baseline or background concentration and a description is given of the natural variability of CO2 concentration, including within-hour and diurnal variability, seasonal cycles, interannual and secular trends. The average rate of concentration increase over the period represented by the data was 1.5 ppmv/yr. A comparison is made between the selected data from these programs and similar data sets collected at Amsterdam Island and in New Zealand by other international projects. (Auth.)

I-35475

Tanaka, M., **Variations of atmospheric carbon dioxide concentration at Syowa Station (69 deg 00'S, 39 deg 35'E), Antarctica,** *Tellus,* Feb.-Apr. 1987 39B(1-2), p.72-79, 7 refs.

Precise measurements of the atmospheric CO2 concentration were initiated at Showa Station, Antarctica in 1983. Preliminary inspection of the data obtained up to the present showed that: (1) a regular diurnal variation is not observable; (2) irregular variations are sometimes observed with extremely small amplitudes of 0.2 ppmv at most; (3) a seasonal variation with the minimum concentration in mid-Apr. and the maximum concentration in mid-Oct.; and peak-to-peak amplitudes of about 1.2 ppmv are detected; (4) annual mean values of the CO2 concentration are 341.2 and 342.6 ppmv for 1983 and 1984, respectively. (Auth.)

I-35476

Levin, I., Kromer, B., Wagenbach, D., Münnich, K.O., **Carbon isotope measurements of atmospheric CO2 at a coastal station in Antarctica,** *Tellus,* Feb.-Apr. 1987 39B(1-2), p.89-95, 20 refs.

A 3-year series of weekly 3-days integrated CO2 samples analyzed for C-13/C-12 isotopic ratio is presented, as well as a 2-years continuous sample series of 1-2 weeks integration time, analyzed for C-14 activity. The samples were collected at Georg von Neumayer research station situated at the Antarctic coast at 70 deg S, 8 deg W. Trends and variations in C-13/C-12 isotopic ratios are presented and discussed. Interhemispheric comparisons in these ratios are made and changes between Southern Hemisphere high and low latitude amounts are given. Probable causes for the various differences are noted. (Auth. mod.)

I-35477

Siegenthaler, U., Oeschger, H., **Biospheric CO2 emissions during the past 200 years reconstructed by deconvolution of ice core data,** *Tellus,* Feb.-Apr. 1987 39B(1-2), p.140-154, 39 refs.

Measurements on air trapped in old polar ice from Siple Station have revealed that the pre-industrial atmosphere contained 280 ppm of CO2 and that *delta*C-13 of atmospheric CO2 decreased by about 1.1 per mill until 1980. These measurements show that considerable amounts of non-fossil CO2 must have already been emitted into the atmosphere in the 19th century. Deconvolution of the CO2 record yields a cumulative non-fossil production of about 90 to 150 Gt C until 1980, of which more than 50% were released prior to 1900. According to model results, the net non-fossil production rate was roughly constant in the 19th and the first part of the 20th century. In the past 30 years, smaller values are obtained which are at the lower limit or below current ecological estimates for deforestation and land use. Calculated C-13 and C-14 time histories agree well with the observed changes. While the change of the atmospheric CO2 concentrations reflects more the cumulative carbon release, the isotope concentrations are more sensitive to short-term changes of the emission rate. (Auth. mod.)

I-35478

Elliott, W.P., Angell, J.K., **On the relation between atmospheric CO2 and equatorial sea-surface temperature,** *Tellus,* Feb.-Apr. 1987 39B(1-2), p.171-183, 19 refs.

Associations between the sea-surface temperature (SST) in the eastern equatorial Pacific and changes in atmospheric CO2 concentration have been examined. The CO2 records at Mauna Loa and the South Pole of the Scripps Institution of Oceanography, and the shorter records of the Geophysical Monitoring for Climatic Change program at Barrow, Samoa, the South Pole and Mauna Loa, were used after the annual cycles and the growth due to fossil fuel emissions had been removed. It was found that warmer than average SST precedes above-average increases in CO2 by about one season at Mauna Loa and two seasons at the South Pole. The shorter records at Samoa and Barrow support longer lags: 2-3 seasons at Samoa and 3 to 5 seasons at Barrow. The correlations and their lags change with time, however, there being periods of relatively high correlation associated with El Niño events and periods of lower correlation when El Niño is not present. Furthermore, there is a seasonal preference for these high correlations. At Mauna Loa, the change of CO2 from (NH) fall to spring is better correlated with antecedent SST than the changes from spring to fall. At the South Pole, a similar pattern is found with a one-season shift. (Auth.)

I-35485

Kottmeier, C., Stuckenberg, H.-U., **Quasi-geostrophic flow solution for the circulation over Antarctica,** *Beiträge zur Physik der Atmosphäre,* Nov. 1986 59(4), p.491-504, In English with French and German summaries. 27 refs.

The main features of the mean circulation over Antarctica in summer and winter are derived from a description of the temperature field by analytical functions. The antarctic temperature field results from an empirical determination of the height of one isentropic surface and of the vertical temperature gradient above the planetary boundary layer. The temperature distribution shows that the antarctic continent as a first order effect causes a disturbance of the temperature field, which is closely linked to the topography. The approximation of the data-based isentropic surface is achieved by the superposition of several bell-shaped functions. The stream function results from the vertical integration of these functions, and the velocity components from the subsequent horizontal differentiation of the stream function. The computed wind field for the mean sea level is compared with a geostrophic wind field from reduced pressure measurements. The comparison shows qualitative agreement between 65 S and 90 S. Deviations from polar axisymmetry are also reproduced. (Auth.)

I-35486

Heinemann, G., **Lee-vortices in the Antarctic,** *Beiträge zur Physik der Atmosphäre,* Nov. 1986 59(4), p.599-602, 4 refs.

Obstacles in the atmospheric flow can lead to the formation of waves and vortices of very different scales. Besides synoptic scale cyclones one can observe micro- and mesoscale (vertical) gravity waves as well as mesoscale (horizontal) vortices. Mesoscale eddies can be produced at singly situated mountains or at other particular orographic places. Only with the aid of satellite pictures did it become possible to study the structure of these phenomena. Satellite photos of Peter I Island are used to demonstrate eddy formation at isolated mountain peaks. (Auth. mod.)

I-35491

Dolgin, M.I., Rozanov, E.V., **Sensitivity of long-wave radiation in the antarctic atmosphere to a change in some radiation-forming factors,** *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics,* 1986 22(1), p.15-20, Translated from its Izvestiia. Fizika atmosfery i okeana. 26 refs.

The sensitivity of the calculated long-wave radiation fields in the antarctic atmosphere to variations of the moisture content of different atmospheric layers and the height of the upper boundary of the radiation model is examined. The contribution of ozone and other trace gas components of the atmosphere (CH4 and N2O) to the formation of thermal radiative fluxes and flux divergences is estimated under antarctic conditions compared with mid-latitude. (Auth.)

I-35497

Trenberth, K.E., **Signature of a blocking episode on the general circulation in the Southern Hemisphere,** *Journal of the atmospheric sciences,* Oct. 1, 1986 43(19), p.2061-2069, 14 refs.

Two major blocking events took place over the South Pacific Ocean east of New Zealand, 23 July-4 Aug. and 19-27 Aug. 1979. The configuration of the overall flow, including the split in the westerlies, the location of the blocking highs, and the wavenumber breakdown were very similar. The tendency for blocking highs to reform in the same location in close sequence is referred to as a blocking episode. The blocking events are analyzed in detail and the imprint they left on the general circulation statistics for the winter as a whole are presented. Since the blocking episode mostly prevented eddies from moving through the region, the variance of meridional velocity is small. Nevertheless, owing to the sequence of blocks the variance of geopotential height is a maximum. This signature on the general circulation is in marked contrast to that in storm track regions where the variance of geopotential height and meridional wind are both a maximum. A global-scale redistribution of mass was associated with the blocking episode. Antarctic data are included in the analyses. (Auth. mod.)

I-35498

Trenberth, K.E., **Assessment of the impact of transient eddies on the zonal flow during a blocking episode using localized Eliassen-Palm flux densities,** *Journal of the atmospheric sciences,* Oct. 1, 1986 43(19), p.2070-2087, 24 refs.

In this paper the entire Southern Hemisphere blocking episode described in I-35497 is examined in greater detail with emphasis on the role of the transient eddies and their influence on the zonal mean flow. In particular, a question of considerable interest is the role of the eddies in maintaining or destroying the block. The theory for the local E-P flux is developed first for an *f*-plane to illustrate the concepts and then for full spherical geometry. The results are discussed in terms of the previous theories of Hoskins et al. and Plumb. The relevant fields for the case study of the blocking episode are presented as derived from FGGE IIIb data, and the initial results are given from the perspective of barotropic instability alone. A more comprehensive theory for the local E-P flux is then applied to the case and the flux vectors and computations of its divergence are presented, which represents the main eddy forcing on the zonal mean flow. Results are discussed and conclusions drawn.

I-35529

Stearns, C.R., Weidner, G.A., **Antarctic automatic weather stations, austral summer 1984-1985,** *Antarctic journal of the United States,* 1985 20(5), p.189-191, 3 refs.

The automatic weather stations (AWS) measure air temperature, air pressure, wind speed and wind direction under the control of a microcomputer. The data are updated every 10 minutes and transmitted at 200 second intervals to the Argos system on the NOAA series of polar orbiting satellites. The objectives are the following: barrier wind along the Transantarctic Mountains and the Antarctic Peninsula; katabatic flow down the Adelie Coast, Byrd Glacier and Reeves Glacier; meso-scale circulation on the Ross Ice Shelf; climatology of Dome C, Byrd Station and Siple Station; sensible and latent heat fluxes on the Ross Ice Shelf; oceanographic support; and meteorological support for aircraft operations at McMurdo. During AS 84-85 five of the seven AWS units which ceased being received by the Argos system were repaired and reinstalled. Two AWS units were deployed to 79.56 S, 169.45 E and 80.00 S, 179.00 W on the Ross Ice Shelf. Improvements made to the AWS units included a waterproof box, a short boom with the aerovane at the midpoint and a ground plane antenna. Eighteen of the 22 AWS units deployed are being received with correct data as of 1 May 85.

I-35530

Cronn, D.R., Ferrara, T.W., Bamesberger, W.L., **Air chemistry monitoring at Palmer Station,** *Antarctic journal of the United States,* 1985 20(5), p.191-192, 7 refs.

The 1984-1985 season was the third year of operation for the Washington State University Palmer Station air chemistry facility. The two-fold objective for the 1984 season was to continue the atmospheric trace chemistry monitoring and to measure the chemical composition of precipitation. The concentrations as a function of time are shown for nitrous oxide F-12, F-11, carbon tetrachloride, and methyl chloroform, respectively. Missing data result both from periods of equipment failure and unreduced data. The data cover the

period from Apr. 4, 1982 through Apr. 27, 1985. A table shows the preliminary results of the time trend regression analysis for five of the atmospheric components based on 3 years of preliminary average weekly concentrations. The trends for F-11, F-12, methyl chloroform, and carbon tetrachloride continue to show increasing concentrations of 5.2%, 5.9%, 5.5%, and 1.3% per year, respectively. Rain samples were analyzed for pH and acidity, anions and cations. Preliminary results of the pH measurements gave volume-weighted means for the Palmer Station samples only of 4.68, 4.98, and 5.13 for Jan., Feb., and Mar. 1985, respectively. These values are lower than the pH of 5.65 expected from equilibrium with atmospheric carbon dioxide and therefore might be considered "acid" rain.

I-35531

Losleben, M., **Weather and solar radiation measurements at Mount Takahe and Mount Murphy, West Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.193-196, 3 refs.

The weather was recorded one to six times each day, as conditions permitted, from Dec. 21, 1984 through Jan. 18, 1985 primarily around the base of Mount Takahe but also for 5 days near Mount Murphy. A table summarizes these recordings. Solar radiation was recorded from Jan. 10 to 17, 1985 at the Gill Bluff camp near Mount Takahe but only the entire days of Jan. 11 to 16 are tabulated. This is total incoming (direct plus diffuse), short-wave (285- to 2,800-nanometer) radiation reaching the ground. The total incoming radiation in 20-minute totals by day, with the total for that day, is shown. Some comparisons were made with other sites and with calculations. The Mount Takahe values ranged from a high of 63.2 to 60.7% to a low of 51.6 to 50.0% of their corresponding calculated values. For these 6 days in Jan., this antarctic site compared closely, though a bit lower, to a similar (by latitude) arctic site. Some possible mitigating factors could have been the proximity of Mount Takahe and greater cloud coverage.

I-35532

Bromwich, D.H., **Katabatic wind interaction with Inexpressible Island, Terra Nova Bay,** *Antarctic journal of the United States,* 1985 20(5), p.196-198, 9 refs.

The interaction of gale force katabatic winds with the steep topography of Inexpressible I. shows a strong seasonal dependence. In summer the airflow overrides cliffs more than 300 m high, and creates a stagnation zone on the windward side of the obstacle. In winter it is inferred that the air is generally deflected around the main part of the island. Summer data usually demonstrate that measurements from the automatic weather station (AWS) sited on the southern tip of the island accurately reflect the characteristics of the upwind katabatic airflow. It is possible that the winter AWS data are less representative.

I-35533

Saxena, V.K., Ruggiero, F.H., **Real-time measurements of droplet size distribution in antarctic coastal clouds,** *Antarctic journal of the United States,* 1985 20(5), p.198-200, 15 refs.

In the Ross Ice Shelf region, measurements of cloud droplet size distribution were carried out using a forward scattering spectrometer probe (FSSP) in coastal clouds during Nov. 1980. The two-dimensional cloud boundaries for Nov. 3-5, 1980 are illustrated. A table summarizes the observed and calculated parameters for each cloud. These parameters are representative of what one would expect to find in maritime clouds. A strong correlation was observed between the droplet diameter and height from the cloud base with a correlation coefficient of 0.93. The spectral broadening with height is also readily apparent when comparing individual droplet size distributions. It can be seen that all the clouds exhibit bimodal size distributions of varying degrees with an initial peak in concentration occurring at a diameter less than 4 micrometers. The diameter at which the second peak occurs varies between 12 and 16 micrometers, and it is this peak that seems to vary with height. Since aerosols as large as 100 micrometers are known to exist in the atmosphere, it is possible a second peak in droplet size distribution could result from these CCN. The sea is believed to be a source for some of these ultra-giant aerosols.

I-35534

Saxena, V.K., Ruggiero, F.H., Parungo, F.P., **Airborne measurements of the antarctic cloud water acidity,** *Antarctic journal of the United States,* 1985 20(5), p.201-203, 8 refs.

Samples of cloud water were collected from antarctic coastal stratus during the 1982-1983 austral summer to assess the natural component of cloud-water acidity. The pH value ranged between 4.9 and 6.2, and the average value was below that expected for the Antarctic, so far from all anthropogenic sources of acidic and acidifying substances. Acidity was found to increase with height inside the cloud probably due to the entrainment of sulfate rich stratospheric air at the cloud top. Average levels of sulfate were found to be of the same magnitude as those in more anthropogenic regions while nitrate levels were much lower in antarctic stratus clouds than elsewhere. Results of the analysis of the cloud water samples are presented.

I-35535

Shaw, G.E., **Nature and size of microscopic airborne particles at McMurdo Station,** *Antarctic journal of the United States,* 1985 20(5), p.204.

Studies were carried out from the cosmic ray station near McMurdo Station on Ross Island to investigate the origin, number concentration, and size of the remnant particles suspended in the very clean antarctic air. Particles larger than about 2 micrometers were strongly depleted in the "background" antarctic air. In terms of aerosol mass, evidence was found for the occasional existence of a large to giant mode during times when the winds were high or from the direction of the sea. Geometric mean diameter of the particles was 0.015 micrometer. Aerosols down to 0.1 micrometer diameter were impacted on barium sulfate screens and found to leave etching patterns similar to those caused by droplets of sulfuric acid. Additional evidence suggesting a sulfuric acid composition was obtained from the relatively low boiling point of the submicron particles; they decomposed at about 150 C. Sulfate mass concentration in the submicron sizes was measured with ion chromatography and yielded a mean mass loading of 0.1 microgram/cu m.

I-35536

Hogan, A.W., Samson, J.A., **Aerosol transport processes in the Antarctic,** *Antarctic journal of the United States,* 1985 20(5), p.205-206, 4 refs.

The 1984-1985 summer activities at Amundsen-Scott Station are reported. They include aerosol observations and particle collections; wind surveys, with updating of wind instruments on the meteorological tower and installation of an experimental precipitation collector; vertical measurements of temperature on the tower; and working with a new computer system through a series of programs to facilitate on-site analysis and reduction of meteorological, climatological, and upper-air data. Due to the occurrence of very large sastrugi in the vicinity of the station, a polished steel funnel was used as a radiation shield for temperature measurements on the surface of the sastrugi which resulted in readings showing large temperature differences between the sunlit and shadowed sides. For aerosol experiments in Nov. a new impactor concentrator was used to collect particles with diameters greater than 0.1 micrometer but less than 0.5 micrometer which seem to dominate the particle mass, according to light-scattering measurements. Analysis of these particles showed an abundance of sulfur. Silicon-containing particles were frequent in the size classes above 0.5 micrometer. A similar experiment was conducted

during Jan., and one of the most interesting aspects of this period was the strong, and unusually high, temperature inversion located about 1,000 m above the surface.

I-35537
Khalil, M.A.K., Rasmussen, R.A., **Trend of bromochlorodifluoromethane and the concentrations of other bromine-containing gases at the South Pole,** *Antarctic journal of the United States,* 1985 20(5), p.206-207, 11 refs.

Concentrations of 8 manmade and natural bromine-containing trace gases at the South Pole during the last quarter of 1984, and the increasing concentrations of bromochlorodifluoromethane (CBrClF2), are discussed. . The seasonally averaged concentrations over nearly 6 years (from Jan. 1979 through Dec. 1984) are shown. The ratio of the Northern Hemisphere to Southern Hemisphere concentrations is about 1.3 suggesting that the atmospheric lifetime of CBrClF2 is relatively long, probably much longer than a decade. The concentrations of 7 other bromine-containing gases at the South Pole, during the period from Oct. through Dec. of 1984, are reported in a table. The total gaseous bromine concentration is about 22 parts per trillion by volume. The ratios of the concentrations observed at the South Pole and at Point Barrow in the Arctic at about the same times are also tabulated.

I-35538
Murcray, F.J., Murcray, F.H., Murcray, D.G., **Measurements of column amounts of atmospheric trace gases during the antarctic winter,** *Antarctic journal of the United States,* 1985 20(5), p.208.

The goal of this program is to operate an infrared spectrometer system to measure the thermal emission of the atmosphere for an extended period, including part of the austral winter. A prototype instrument was operated for a few weeks at Amundsen-Scott Station during the 1982-1983 austral summer. With the experience gained from that experiment, a more elaborate system was constructed, the atmospheric emission radiometer (AER). The AER will provide an initial site survey for infrared astronomy by measuring atmospheric emissions over a long period. It will also give information on the radiative balance of the antarctic region from the observations of the snow surface.

I-35539
Ohtake, T., **Chemical tests of antarctic hygroscopic aerosols,** *Antarctic journal of the United States,* 1985 20(5), p.208-210, 7 refs.

To clarify the mechanism of polar atmospheric ice crystals, aerosols for ice nucleation were examined at the South Pole in austral summers 1982-1983 and 1983-1984. Formation of ice crystals on the aerosols was confirmed when relative humidity rises to 82% at -25 C or 79% at -37 C. On the basis of these observations, it is postulated that the hygroscopic aerosols in the polar atmosphere deliquesce in ambient humid air and are followed by freezing of the submicron-sized water droplets to ice crystals at low temperatures. These short-lived water droplets and subsequent ice crystals are small enough to be nearly invisible, unless the ice crystals grow to a larger size. The minimum size of collected particles was estimated to be 0.01 micrometer in diameter. An example of the particles collected is shown. The preliminary results of electron microscopy show the following: most of the aerosols sampled by the cascade impactor were identified as sulfate; the low-pressure impactor was able to collect sulfuric acid particles at a rate of about 4 particles per cu cm at mean diameter of 0.1 micrometer; minimum size detected was 0.1 micrometer; the factions of sulfate particles were about 99% total aerosols. Other aerosols (1%) were identified as combustion by-products and soil particles rather than sulfate; those few soil particles do not seem to be mixed with any sulfate.

I-35540
Cassidy, W.A., Witkowski, R.E., Penney, G.W., **Atmospheric particle collections at Amundsen-Scott South Pole Station during 1984,** *Antarctic journal of the United States,* 1985 20(5), p.210-212.

During 1983, a program was begun at the geographic South Pole to collect atmospheric dust particles in the size range 0.01 to 1 micrometer, and this effort continued during 1984. It is found that submicroscopic particles are very abundant in the atmosphere at Amundsen-Scott Station. The most common constituent of the collections is droplets of sulfuric acid; it is also common to find submicroscopic alumino-silicate spheres that probably are slaggy by-products of fuel burning. In addition to particles such as these which can be identified as terrestrial contaminants, a number of particles were found whose terrestrial origin could not be confirmed. Even more numerous than sulfuric acid droplets are rod-shaped grains 0.05 to 0.10 micrometer in length that give calcium and sulfur signatures under STEM/EDS (scanning transmission electron microscopy/energy dispersive systems) analysis. Rather rare in number, but perhaps more significant in mass, is another group of grains that apparently consists of single metallic elements (or their oxides, hydroxides, carbides, or carbonates).

I-35541
Wendler, G., Kodama, Y., Gosink, J., **Automatic weather stations in eastern Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.212-213, 4 refs.

In a joint French-U.S. experiment, five automatic weather stations (AWS) have been installed on Adélie Coast. They report data by satellite and since 1980 have supplied a steady flow of meteorological information. They are located roughly on 1 line from D10 (240 m altitude), a station 10 km south of Dumont d'Urville Station, to Dome C (3,280 m altitude), the highest station some 1,080 km inland from the coast. The other three stations are located at intermediate points. The mean monthly temperatures of the AWS are given in a figure showing the combined data from 4 stations. The mean diurnal variation of the wind vector at D80, in summer 1983, is also shown. The strongest winds are observed around noon, while the most downslope wind occurs in the early morning hours, when the inversion strength has reached its maximum.

I-35542
Mroz, E.J., **Detection of atmospheric tracers in Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.214-215.

Two tracer gases, 12CD4 and 13CD4, were used to study meridional flow in Antarctica. Releases were conducted in Jan., June and Oct. of 1984. The Jan. and June releases consisted of 1 kg of 13CD4 released at about 60 S, 70 E and at 18000 ft MSL. The Oct. release consisted of 1 kg of 13CD4 released at 5000 ft MSL and 20 kg of 12CD4 released at 18000 ft MSL at approximately the same location as the two earlier releases. Sampling for the tracers was conducted at eight stations and, following the Jan. and Oct. releases, by aircraft. Following the Jan. release, tracer was detected over the Ross Ice Shelf 26 hours after the release. Tracer was also detected at Amundsen-Scott and Halley Bay stations within about 10 days after the release.

I-35543
Dilts, S.B., Cronn, D.R., **Determination of sulfur gases in the antarctic atmosphere,** *Antarctic journal of the United States,* 1985 20(5), p.215-216, 5 refs.

A research program was conducted during austral summer 1985 to survey the ground-level concentration of atmospheric sulfur gases in Antarctica. The measurements were made by metal foil collection/flash vaporization/flame photometric detection (MFC/FV/FPD). Sample air is passed over a palladium foil strip which adsorbs the sulfur gases. The loaded foil is flash heated by an

electric current, and the desorbed gases are carried to a flame photometric detector which is sensitive to sulfur molecules. The foils are mounted in teflon blocks which can be taken into the field, sampled with portable pumps, and returned to the laboratory for analysis. Preliminary results from the MFC/FV/FPD analyses show total sulfur gas concentrations in the low parts-per-trillion range which is much less than expected, based on other investigators' results for remote areas. Testing of the repaired MFC/FV/FPD system and statistical analysis of the results are continuing to check the validity of the measurements.

I-35544

Hofmann, D.J., Rosen, J.M., **High-altitude aerosol variations associated with stratospheric warmings,** *Antarctic journal of the United States,* 1985 20(5), p.217-218, 2 refs.

In Oct. 1983 a balloon sounding was conducted to determine to what extent volcanic sulfuric acid aerosol, injected by the eruption of El Chichon in Mexico in Apr. 1982, had affected the antarctic stratosphere. A sizeable layer of aerosol was detected in the 10 to 17 km altitude range. In 1984, the measurements were repeated, this time with two optical particle counters for better resolution and two balloon soundings, one at McMurdo Station on Nov. 1, 1984 and one at Amundsen-Scott Station on Nov. 10, 1984. As in 1983, a stratospheric warming was again underway during the soundings. The wind speeds in the 20 to 30 km altitude region were quite high, peaking at about 70 m/s at McMurdo on Oct. 29. These high winds suggested that the aerosol has been in several temperature regimes during a day or two prior to their observation and resulted in very complicated distributions. The results of the two balloon soundings for both the large and small aerosol are shown. The remnants of the El Chichon eruption can be seen in the larger, optically active aerosol (radius greater than 0.15 micrometer) between about 9 and 18 km altitude. This layer, which is a global feature, is nearly identical at the two stations. The peak concentration is about 3.5 particles per cu cm. One year earlier this concentration was 7.0 particles per cu cm. Thus the layer has decayed by a factor of two in 1 year.

I-35576

Garcia, K.S., **Weather observing and transmitting problems in the Antarctic,** *Antarctic journal of the United States,* 1985 20(5), p.269-270.

Antarctic weather problems which have plagued observers and frustrated forecasters since before the IGY continue unchecked and unresolved: paucity of antarctic data, even during the summer season; rapidly changing surface conditions due to the summer opening of the Ross Sea; unreliable transmission of weather data, with no provisions for resending missed data; interference with communication due to atmospheric disturbances. More advanced communication systems are expected to improve the reliability of meteorological data received from the continent. Examples of local differences in weather factors are also shown.

I-35578

Lal, D., Nishiizumi, K., Arnold, J.R., ***In situ* H-3, C-14, and Be-10 for determining the net accumulation and ablation rates for ice sheets,** *Journal of geophysical research,* May 10, 1987 92(B6), p.4947-4952, 32 refs.

The usefulness is explored of the *in situ* cosmogenic H-3, C-14, and Be-10 produced by spallation of oxygen nuclei in ice, as tracers to determine net accumulation/ablation rates of ice sheets. The application of the *in situ* H-3 and Be-10 is severely constrained because, at deposition, ice contains appreciable amounts of these isotopes from the atmosphere. The case is much more favorable for C-14, which is not carried with wet precipitations; atmospheric C-14 gets mechanically trapped in the ice during deposition. It is pointed out that cosmogenic C-14 would probably exist as CO-14 in ice. Conditions under which these isotopes can be used to study net accumulation and ablation rates are discussed along with available data on C-14 and Be-10 on polar ice from accumulation and ablation zones. It is concluded that H-3 and C-14 should find wide applications in studying ice dynamics and Be-10 in very special circumstances. Tables are included showing concentrations of C-14 and Be-10 at Byrd Station, Allan Hills, Dome C, Vostok, and in the Yamato Mountains. (Auth.)

I-35579

Wu, M.-F., Geller, M.A., Olson, J.G., Larson, E.M., **Study of global ozone transport and the role of planetary waves using satellite data,** *Journal of geophysical research,* Mar. 20, 1987 92(D3), p.3081-3097, 51 refs.

Global ozone fluxes and flux divergences within the region between 30 and 0.4 mbar are computed for the period from Dec. 1, 1978 to Nov. 30, 1979, using Nimbus 7 solar backscattered ultraviolet ozone profiles and meteorological data derived from NOAA satellites. The annual cycle of ozone transports in the Northern and Southern Hemispheres is presented and discussed. It is found that planetary scale waves are responsible for initiating the high-latitude ozone buildup in winter. The time of occurrence and the position of the annual maximum ozone are found to be closely related to the planetary wave activity in both hemispheres. (Auth.)

I-35580

Gillette, D.A., Komhyr, W.D., **NOAA/GMCC continuous CO2 record at the South Pole, 1975-1982,** *Journal of geophysical research,* Apr. 20, 1987 92(D4), p.4231-4240, 20 refs.

Hourly carbon dioxide concentrations at the south pole were obtained by nondispersive infrared analyzers for the years 1975-1978 and 1980-1982. A spectral analysis of the ambient CO2 variability showed very little power for periods shorter than 5 days. The data showed good agreement with other data sets for the range of the annual fluctuation from 1977 to 1982 and disagreements for 1976. The estimated annual CO2 increase (about 0.6 to 2 ppm/yr) and ranges of seasonal fluctuation were insensitive to the data selection methods used. After 1979, seasonal fluctuations apparently decreased. (Auth.)

I-35581

McCormick, M.P., Trepte, C.R., **Polar stratospheric optical depth observed between 1978 and 1985,** *Journal of geophysical research,* Apr. 20, 1987 92(D4), p.4297-4306, 51 refs.

Observations of the stratospheric optical depth at 1.0 micron obtained for high latitudes are presented for a 7-year period. Weekly averaged data show that the overall yearly values in both polar regions are controlled by volcanic perturbations, with most volcanic effects being experienced in arctic latitudes. The largest values over this period were observed after the eruption of El Chichon in 1982. Conservatively, peak values found in the antarctic region were approximately 0.02 and in the arctic region about 0.55. Probable values for these regions were estimated to be 0.26 and 0.11, respectively. Comparison of the optical depth record with a weekly averaged 50-mb temperature record indicates that polar stratospheric clouds are present in the southern high latitudes each year near this level from early June to early Sep. A depression observed in the optical depth record each austral spring season is believed to be the result of the downward displacement of particles caused by subsidence and sedimentation during the course of winter. Following the breakup of the vortex, optical depth values increase as aerosol is transported poleward. These features are noted to be present in the Arctic region as well, but on a smaller scale because of the satellite sampling methodology and the averaging scheme employed. (Auth.)

I-35586
Moczydlowski, E., **Microclimate of the nest sites of pygoscelid penguins (Admiralty Bay, South Shetland Islands),** *Polish polar research,* 1986 7(4), p.377-394, 23 refs.

The microclimate of the nest sites of *Pygoscelis adeliae, P. antarctica* and *P. papua* was studied from Dec. 1979 to Jan. 1981. The temperature of the ground, air temperature at 0.05 m, 0.35 m and 2 m and wind velocity at 0.35 m and 2 m above the ground were recorded. The wind velocity in the places chosen by penguins for nesting was lower than that at the meteorological station by 22% to 60%. It was proved that in winter the mean monthly ground temperature at the nesting places was lower than that at the meteorological station by 6 to 8 C due to the much thinner snow cover. Pygoscelid penguins chose, for nesting, places of specific microclimate and modified the wind velocity, temperature of the ground and, to a lesser extent, the air temperature. (Auth.)

I-35630
Dudeney, J.R., **The antarctic atmosphere,** Antarctic science, D.W.H. Walton, ed., Cambridge, Cambridge University Press, 1987, p.190-247, 12 refs. (p.273).
DLC G860.A555 1987

Through the years of meteorological and upper atmosphere and space research it has become evident that understanding these regions as they work in Antarctica is requisite to understanding the upper reaches on a global basis. Details of gathering the data for this understanding are given in this essay: paleoclimates; history of weather observations in Antarctica; development and impact of satellites and automatic weather stations; the clear, cold antarctic winters and the accompanying surface inversion; katabatic winds; stratospheric circulation and the ozone layer; geospace research, solar wind, magnetic field, and the magnetosphere; the research milestones of the IGY, IQSY, all-sky-camera, riometer, and ionosondes; and the prime roles played by Halley and Siple Stations in this research.

I-35686
Chubachi, S., Kondoh, K., **On the relationship between the monthly mean of total ozone amounts and the monthly mean of stratospheric temperature at Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.1-8, 8 refs.

The relationship between the monthly mean of total ozone amounts and the monthly mean of air temperature in the stratosphere at Showa Station was studied for the period 1961-1983. There is a very good positive correlation between the total amount of ozone and the stratospheric temperature in Oct. and Nov. The scatter diagrams and regression curves for each month are also described. (Auth.)

I-35687
Hirota, M., Makino, Y., Muramatsu, H., **Vertical distributions of atmospheric CF2Cl2, CFCl3 and N2O over Syowa Station in 1983,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.9-12, 6 refs.

Air samples were collected on an aircraft over Showa Station up to an altitude of 7.3 km on Jan. 24, Apr. 5, Oct. 18 and Dec. 12, 1983. Trace gases CF2Cl2, CFCl3 and N2O were measured by a GC-ECD method. These gases were vertically mixed well. Seasonal variation of vertical profiles could not be detected. (Auth.)

I-35688
Iwasaka, Y., **Descending motion of antarctic stratospheric aerosol layer in winter: possible effect on stratospheric water vapor budget,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.13-18, 16 refs.

Lidar measurements at Showa Station revealed that the centroid of aerosol layer descended at the rate of 0.8 mm/s during winter. If this motion is a substantial movement of aerosol particles, the mass of water transported into the troposphere is about 50,000,000 t/winter, and the antarctic winter stratosphere is an important sink of stratospheric water vapor. If it is a downward air motion carrying small ice crystals, the value is reduced to 50,000 t/winter. (Auth.)

I-35689
Kakegawa, H., Yasunari, T., Kawamura, T., **Seasonal and intra-seasonal fluctuations of polar anticyclone and circumpolar vortex over Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.45, Proceedings of the Eighth Symposium on Polar Meteorology and Glaciology, p.19-29, 4 refs.

Fluctuations of the polar anticyclone at sea level and the circumpolar vortex at 500 mb are examined by using daily sea level and 500-mb weather maps of 1983. In addition to the seasonal cycle, a remarkable intra-seasonal fluctuation with a period of about 30 days is noticed in the intensity of polar anticyclone and in the circumpolar vortex. It is also noticed that in the seasonal time scale the intensities of polar anticyclone and circumpolar vortex show a positive correlation while in the intra-seasonal time scale these two are negatively correlated. (Auth.)

I-35717
Parish, T.R., Bromwich, D.H., **Surface windfield over the antarctic ice sheet,** *Nature,* July 2-8, 1987 328(6125), p.51-54, 18 refs.

The intense radiative cooling of air over the ice slopes of Antarctica generates a surface wind regime that is strongly controlled by topography, and plays a key role in determining the behavior of the atmosphere and ocean in high southern latitudes. Resultant surface winds are intimately linked to the orientation of the ice terrain and display the highest degree of persistence found on Earth. The close coupling between wind and topography allows estimation of the former if the latter is known with some precision. Here we report on time-averaged, near-surface airflow over the antarctic continent during winter diagnosed from a recent, accurate synthesis of terrain slopes and from estimates of the lower atmospheric temperature structure. The simulated drainage pattern exhibits strong spatial variability with the airflow concentrated into several zones near the coastal margin. These confluence regions are responsible for strong persistent katabatic winds over downstream coastal stretches and are indicative of zones of greatest katabatic potential. (Auth.)

I-35721
Romanov, V.F., Lagun, V.E., **Eddy dynamics and energetics of the Southern Hemisphere atmosphere in climatic scales** [O vikhrevoĭ dinamike i energetike atmosfery iuzhnogo polushariia v klimaticheskikh masshtabakh], *Akademiia nauk sSSR. Doklady,* 1986 291(4), p.817-822, In Russian. 15 refs.

Studies of the relationship between atmospheric eddy dynamics and climatic conditions are reviewed. Significant difference has been found between the characteristics of synoptic eddies and the surrounding air masses of the mean currents. The energy parameters of climatic eddies, their position and the cyclonic areas of synoptic activity, are shown in charts and discussed.

I-35722
Randel, W.J., **Study of planetary waves in the southern winter troposphere and stratosphere. Part 1: Wave structure and vertical propagation,** *Journal of the atmospheric sciences,* Mar. 15, 1987 44(6), p.917-935, 18 refs.

Planetary wave propagation in the southern winter troposphere and stratosphere is studied in an attempt to trace the origins of upward propagating disturbance. Daily geopotential grids from 1000 to 1 mb are analyzed for two 120-day winter seasons. A cross-correlation analysis technique is developed which allows coherent wave structure to be traced in time. Significant correlations are observed between the troposphere and stratosphere at finite time lags, indicative of vertically propagating waves. The cross-correlation analysis also delineates the meridional and vertical structures of the transient (in time) planetary waves. Zonal wavenumber 1 fluctuations exhibit a vertical out-of-phase relationship between the midaltitude troposphere and stratosphere. Three out-of-phase maxima in latitude are observed in the troposphere, separated by 25-30 deg latitude, whereas a single broad latitudinal maximum is found in the stratosphere. Two out-of-phase maxima in latitude are observed in the troposphere, separated by 30-35 deg latitude, and the stratospheric variance is found to be coherent and in phase with that in the high latitude troposphere. (Auth. mod.)

I-35723
Randel, W.J., Stevens, D.E., Stanford, J.L., **Study of planetary waves in the southern winter troposphere and stratosphere. Part 2: Life cycles,** *Journal of the atmospheric sciences,* Mar. 15, 1987 44(6), p.936-949, 17 refs.

Large-amplitude planetary waves in the southern winter stratosphere are observed to occur episodically, the result of episodic tropospheric forcing. This work is an observational study of the dynamics of the planetary waves, focusing on the evolution through a typical life cycle. Time lag correlations of wave amplitude with the Eliassen-Palm flux vector reveal the characteristic heat and momentum flux patterns associated with wave evolution. Energetic studies clearly show that the stratospheric waves can be understood in terms of a life cycle of vertical propagation from the troposphere, followed by decay from barotropic interactions with the zonal mean flow. Although usually of secondary importance, baroclinic decay of stratospheric wave energy is also observed, resulting from equatorward heat flux in the lower stratosphere. Good agreement in the energy balances discounts *in situ* instability in the stratosphere as a source of wave activity. An average or composite over several clearly propagating cases reveals the wave structure and evolution, and suggests a source of planetary wave activity in the upper troposphere. (Auth.)

I-35724
Prather, M., **Chemistry of the global troposphere: fluorocarbons as tracers of air motion,** *Journal of geophysical research,* June 20, 1987 92(D6), p.6579-6613, Refs. p.6611-6613.

Winds and convective mixing from a general circulation model of the atmosphere have been applied in a chemical tracer model to simulate the global distribution and temporal variability of chlorofluorocarbons (CFCs). The model reproduces global distributions and trends for CFC-11 and CFC-12 observed by the ALE experiment; however, subgrid diffusion must be introduced into the model in order to reproduce the observed interhemispheric gradient. Interhemispheric exchange occurs mainly in the upper tropical troposphere, producing a profile which increases with altitude in the Southern Hemisphere, in agreement with observations. The distribution of CFCs is such that it is necessary to apply important corrections to observations at surface stations in order to derive global distributions. (Auth. mod.)

I-35756
North, D.C., **Green flash in Antarctica, April 1985,** *Weather,* May 1987 42(5), p.144-145.

A phenomenon commonly referred to as the 'Green Flash', caused by a combination of atmospheric refraction and selective absorption is discussed and shown in photographs. This example occurred in Antarctica in Apr. during the austral winter of 1985 and was photographed from Halley Station, a geophysical observatory on the Brunt Ice Shelf. Conditions at Halley are particularly suitable since it provides an almost unobstructed view of the horizon in every direction through an exceptionally clean atmosphere. The photographs were taken just before local noon, two days before the sun set prior to the three-month polar night; the red glow of dawn could be clearly seen traversing the horizon.

I-35771
Gao, X.-H., Yu, W.-B., Stanford, J.L., **Global features of the semiannual oscillation in stratospheric temperatures and comparison between seasons and hemispheres,** *Journal of the atmospheric sciences,* Apr. 1, 1987 44(7), p.1041-1048, 20 refs.

Four years of satellite-derived microwave and infrared radiances are analyzed for the three-dimensional and seasonal variation of semiannual oscillations (SAO) in stratospheric temperatures, with particular focus on high latitudes, to investigate the effect of stratospheric warmings on SAO. Separate analyses of individual seasons in each hemisphere reveal that the strongest SAO in temperature occur in the Northern Hemisphere (NH) winter polar upper stratosphere. These results, together with the latitudinal structure of the temperature SAO and the fact that the NH polar SAO is nearly out of phase with the lower latitude SAO, are consistent with the existence of a global-scale, meridional circulation on the SAO time scale. The results suggest that polar stratospheric warmings are an important source of SAO in both high and low latitude stratospheric temperature fields. Interannual variations, three-dimensional phase structure, and zonal asymmetry of SAO are also detailed. The SH stratospheric SAO is dominated by a localized feature in the high-latitude, eastern hemisphere which tilts westward with height. (Auth.)

I-35813
Vizhenskiĭ, V.A., **Neutron-activation determination of atmospheric microelements in Antarctica and the Indian Ocean** [Neĭtronno-aktivatsionnoe opredelenie mikroelementov v atmosfere Antarktidy i Indiĭskogo okeana], Vsesoiuznoe soveshchanie po iaderno-fizicheskim metodam analiza v kontrole okruzhaiushcheĭ sredy, 3rd, Tomsk, May 21-23, 1985. Trudy (All-Union Conference on nuclear-physical methods of environmental management, 3rd, Tomsk, May 21-23, 1985. Proceedings) edited by IU.A. Izrael', Leningrad, Gidrometeoizdat, 1987, p.35-41, In Russian. 20 refs.

Methods of instrumental neutron activation determination of microelements in the atmosphere are reviewed. Data on trace metal concentrations over Antarctica and in the Indian Ocean are tabulated; the results are analyzed and compared with those obtained by other workers. Some questions related to general background values of atmospheric microelements are briefly discussed.

I-35814
Dolgin, I.M., ed, **Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate of Antarctica,** New Delhi, Oxonian Press, 1986, 213p., For Russian original see 35-2178 or 12I-24432. Refs. passim. For individual papers see 41-3949 through 41-3954 or F-35828, I-35815 through I-35827, and I-35829 through I-35845.

The papers in this collection were presented at a conference on antarctic climatology. Analysis of data collected during long-term studies made possible the refinement of current ideas of meteorological regime, circulation and atmospheric structure in southern polar regions. Much attention is devoted to new aspects of climatology: questions of heat and moisture balance, circulation mechanisms, and upper atmosphere research using rockets. Radiation, albedo, ice sheet mass balance, ice distribution, and ozone, CO, and methane concentration in the atmosphere are also investigated.

I-35815
Voskresenskiĭ, A.I., Dolgin, I.M., Petrov, L.S., **Meteorological studies in Antarctica: main results and problems for further research,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.1-7, For Russian original see 12I-24433. 31 refs.

An appraisal of the progress of Soviet meteorological research in the Antarctic over the past 20 years is given. Successes in laying a technological and logistic base for meteorological work are noted and new directions for study suggested. The importance of international cooperation is stressed. (Auth. mod.)

I-35816
Marshunova, M.S., **Short-wave radiation conditions in Antarctica based on the results of 20 years of observations.,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.8-16, For Russian original see 35-2179 or 12I-24434. 4 refs.

Results of 20 years of data gathering on direct total absorbed radiation and albedo of the reflecting surface are analyzed. Patterns of temporal and spatial distributions are noted. These data will aid in determining variability in radiation fluxes under different cloud conditions and year-to-year variation in monthly radiation totals. (Auth. mod.)

I-35817
Sakunov, G.G., Rusin, N.P., **Background characteristics of the atmospheric transparency conditions over Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.17-24, For Russian original see 12I-24435. 4 refs.

Results of determination of integral and spectral (0.3-1 micron range) atmospheric transparency at Mirnyy are analyzed. The annual patterns of attenuation as a function of wavelength and transparency and of indicators of attenuation in different parts of the spectrum are given. (Auth. mod.)

I-35818
Zaĭtseva, N.A., Shliakhov, V.I., **Long-wave radiation in the atmosphere of Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.25-31, For Russian original see 12I-24436. 6 refs.

Long wave radiation fluxes in the free atmosphere over Antarctica are observed and analyzed both by empirical formulae and from radiosonde data. (Auth.)

I-35819
Kostianoĭ, G.N., **Some statistical parameters of the long-wave radiation field of the free atmosphere at Molodezhnaya,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.32-36, For Russian original see 12I-24437. 7 refs.

The actinometric radiosonde measurements of the atmosphere of Antarctica at Molodezhnaya Station are analyzed for 1966-1968. (Auth.)

I-35820
Petrov, L.S., **Space-time characteristics of the fields of duration of sunshine in Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.37-42, For Russian original see 12I-24438. 2 refs.

Temporal and spatial regularities in distribution of solar radiation periods and of the relation between observed duration and theoretical predictions in Antarctica are presented in map format and analyzed. (Auth. mod.)

I-35821
Dolgin, I.M., Marshunova, M.S., Petrov, L.S., **Climatic data of the south polar region,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.43-45, For Russian original see 12I-24439. 2 refs.

Problems of coordinating long-term meteorological and actinometric observations of the antarctic station network and of preparing a handbook on antarctic climate are discussed. (Auth. mod.)

I-35822
Kolosova, N.V., **Structure of the time-dependence of the surface wind-velocity series in Antarctica in winter,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.46-54, For Russian original see 12I-24440. 9 refs.

Standardization of the self-correlation function calculated from long-term observations over 96-hr periods is considered. The behavior of this function in mid-winter along the coast of East Antarctica and in the subantarctic depression has the same nature: it decreases rapidly and exponentially, remaining positive. (Auth. mod.)

I-35823
Donina, S.M., **Day-to-day and diurnal variability of air temperature in Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.55-58, For Russian original see 12I-24441. 3 refs.

Long-term field data from Soviet and other antarctic stations are analyzed to determine patterns in 6-12 hr and day-to-day air temperature variability and the factors accounting for it. (Auth. mod.)

I-35824
Petrov, L.S., Liubarskiĭ, A.N., **Long-term variability of temperature, pressure and ice conditions in the South Orkney Islands,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.59-65, For Russian original see 35-2180 or 12I-24442. 7 refs.

Data gathered from 1904 to 1972 were analyzed to calculate long-term fluctuations in air temperature, pressure and number of days of ice cover at Orcadas Station. It is shown that climatic variations there have a cyclical nature and covary with arctic climate changes. A 100-yr climatic cycle was noted. There is a connection between South Orkney Is. climatic cycles and cosmic factors. (Auth. mod.)

I-35825
Kolosova, N.V., **Severity of antarctic weather,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.66-71, For Russian original see 12I-24443. 7 refs.

Quantitative indicators of climatic severity based on daily synoptic observations of 25 antarctic stations over a 14-yr period are calculated. The primary factor responsible for severe coastal climate is wind. This is especially true at stations with a constant katabatic wind regime, where the influence of wind exceeds the role of temperature by a factor of 3-3.5. (Auth. mod.)

I-35826
Petrov, L.S., Maksimov, G.A., **Winter climatic conditions in Somov Sea based on the drift data of d/e the *Ob'* in 1973,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.72-79, For Russian original see 35-2181 or 12I-24444. 8 refs.

Results of meteorological observations taken as the *Ob'* drifted in ice from Mar. to June 1973 are analyzed. (Auth. mod.)

I-35827
Voskresenskiĭ, A.I., **Atmospheric moisture flow in Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.80-85, For Russian original see 12I-24445. 3 refs.

Meridional, zonal and derivative flow of moisture in the first 5 km from the surface for each month is presented. Data analysis led to an assessment of each in the moisture flow in various regions of Antarctica. The results correspond fairly well with current notions of atmospheric circulation. Features of the atmospheric segment of the hydrologic cycle and their balance are discussed. (Auth. mod.)

I-35829
Zav'ialova, I.N., **Humidity of air in Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.92-101, For Russian original see 12I-24447. 8 refs.

Spatial and temporal distribution of relative humidity is discussed. The different methods for determining atmospheric supersaturation over high-altitude areas of Antarctica are compared. Mean monthly charts of relative humidity from Jan. to June and charts relating relative humidity to ice in mid-winter months for both the Antarctic and the Arctic are given. (Auth. mod.)

I-35830
Milashenko, G.P., Grigor'ian, V.A., **Cloud fields over Antarctica from satellite data,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.102-108, For Russian original see 12I-24448. 5 refs.

Data on cloud cover gathered by satellite from 1970-1975 in the Antarctic are analyzed. It is established that cloud cover distribution is zonal over the ocean and follows the coastline near the continent. Comparison of satellite data and visual observations of cloud cover indicates some disparity in the results, especially when cloud cover is light. (Auth. mod.)

I-35831
Briazgin, N.N., **Method of preparing monthly charts of atmospheric precipitation in Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.109-116, For Russian original see 35-2183 or 12I-24449. 5 refs.

Error in measuring precipitation in Antarctica and ways to reduce it are discussed. Graphs of the annual precipitation pattern based on corrected mean totals from key stations are given. Monthly precipitation charts are constructed by using these graphs and snow-accumulation results. Variability of annual total precipitation is considered. (Auth. mod.)

I-35832
Voskresenskiĭ, A.I., Chukanin, K.I., **Structure of thermal fields of the free atmosphere over Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.117-124, For Russian original see 12I-24450. 5 refs.

Several new features of temperature fields in the antarctic atmosphere are examined. On the basis of a spatial and temporal analysis of these fields areas in which the cold continent exerts an influence are shown, average temperatures at coastal and continental stations compared, and the most pronounced seasonal temperature changes, especially in the 200-50 millibar zone identified. Several phenomena associated with restructuring of the antarctic atmospheric temperature field begin in the Australian sector. (Auth. mod.)

I-35833
Smirnova, I.P., **Peculiarities of the empirical distribution of air temperature in the free atmosphere over Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.125-131, For Russian original see 12I-24451. 3 refs.

Typical features of spatial and temporal variability of asymmetry coefficients and excess are described. It is shown that magnitude and sign of asymmetry reflect the most characteristic features of temperature regime structure in the area. For smoothing the frequencies, better results are obtained, in a majority of cases, by expansion in Gram-Charlier series, by taking into account the coefficients of skewness and kurtosis. This is revealed by the results of approximation and estimation of the satisfactory fit between the theoretical and empirical distributions. (Auth. mod.)

I-35834
Voskresenskiĭ, A.I., Sveshnikov, A.M., **Statistical analysis of the temperature regime of the atmosphere over Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.132-136, For Russian original see 12I-24452. 5 refs.

Temperature and wind radiosonde data from 4 Soviet and 13 other stations from 1957-1970 were analyzed to determine the distribution of atmosphreric temperature variability in the antarctic atmosphere. The greatest degrees of temperature variation occur in the stratosphere during the spring restructuring of the thermobaric field. This process begins in the Indian-Australian sector and spreads over the entire continent. (Auth. mod.)

I-35835
Ignatiushina, E.N., **Some features of the atmospheric circulation over Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.137-142, For Russian original see 12I-24453. 7 refs.

Circulation intensity and the disturbing effect of orography on air flow throughout the year are studied on the basis of mean monthly climatic features at the 850-30 millibar levels. Kinetic energy is taken as an index of intensity. Air flow deformation due to orography is determined by a correlation coefficient of wind vector components. It is shown that air flow in coastal areas undergoes greatest deformation. (Auth. mod.)

I-35836
Baranov, A.M., Baskin, A.IU., **Density of air and its variability in the lower stratosphere over East Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.143-148, For Russian original see 12I-24454. 6 refs.

Air density variability at 10-26 km altitudes is studied from Mirnyy and Molodezhnaya stations. Features of absolute and relative density variation and correlations which can be used to solve a number of practical problems are described. (Auth. mod.)

I-35837
Karimova, G.U., **Variation in total ozone content in the atmosphere over Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.149-155, For Russian original see 12I-24455. 7 refs.

Results of studies of ozone concentration over the past 20 years are presented. Special attention is devoted to ozone variations during the spring stratospheric warming over Antarctica. (Auth. mod.)

I-35838
IUrganov, L.N., Malkov, I.P., **Latitudinal distribution of carbon monoxide and methane in the atmosphere (from the results of measurements during the 21st SAE),** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.156-163, For Russian original see 12I-24456. 10 refs.

Results of an integration study of distribution of atmospheric CO and methane using data from the 21st SAE are presented. (Auth. mod.)

I-35839
Bugaeva, I.V., **Peculiarities of the autumn reorganization of circulation in the subantarctic stratosphere and mesosphere,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.164-170, For Russian original see 12I-24457. 5 refs.

Mean models of temperature distribution and wind speed over the Southern Hemisphere are constructed with data of 4 experiments on Kerguelen I. from 1973-1976 during which rocket soundings were done. (Auth. mod.)

I-35840
Kidiiarova, V.G., Tarasenko, D.A., Shcherba, I.A., Novikova, N.F., **Statistical analysis of the data on wind and temperature conditions in the stratosphere and mesosphere at Molodezhnaya Station,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.171-177, For Russian original see 12I-24458. 5 refs.

Long-term data are used to compose mean monthly profiles of temperature and wind and coefficient of vertical correlations and harmonic analysis of annual temperature patterns and wind components at mesosphere and stratosphere levels. The statistical characteristics identified can be used to describe average conditions in the Southern Hemisphere winter atmosphere. (Auth. mod.)

I-35841
Voskresenskiĭ, A.I., Chukanin, K.I., **Main features of atmospheric circulation over Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.178-185, For Russian original see 12I-24459. 4 refs.

The position of climatic depressions and cyclonic formations at Southern Hemisphere high latitudes is discussed. An atmospheric circulation scheme for the Antarctic is constructed on the basis of analysis of spatial transformations of pressure field elements. Axes of climatic depressions, the vertical divergence layer, mean isotherms and vertical tropospheric displacement are shown. The antarctic anticyclone is located in the tropospheric layer below the 500 millibar contour. (Auth. mod.)

I-35842
Ryzhakov, L.IU., Rabtsevich, S.V., **Some features of the circulation patterns of the Southern Hemisphere and types of synoptic processes over Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.186-192, For Russian original see 12I-24460. 3 refs.

Forms of atmospheric circulation are arranged into a single classification of types of antarctic processes and of hemisphere macroprocesses. This permits investigation of how these processes interact to produce weather in specific regions. Mean pressure charts for each form of circulation can be used as one component in determining the form involved in a given climatic pattern. (Auth. mod.)

I-35843
Ryzhakov, L.IU., **Peculiarities of seasonal reversal of pressure and temperature fields of the Southern Hemisphere,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.193-199, For Russian original see 12I-24461. 3 refs.

It is shown that features of the annual pattern of air pressure and temperature are determined by seasonal atmospheric circulation restructuring over Antarctica linked to Southern Hemisphere macroprocesses. A dual wave was noted over Antarctica at the 500 millibar level over a year's time and a semiannual wave is seen in air temperature variation. (Auth. mod.)

I-35844
Lysakov, E.P., **Mass balance and mean meridional circulation of the atmosphere over Antarctica,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.200-207, For Russian original see 12I-24462. 6 refs.

Complex studies of air masses over Antarctica both for the entire continent and its separate layers were done on the basis of long-term data. A mechanism is established of regular meridional transfer across the antarctic boundary as a basic factor controlling air mass balance of the south polar area. The structure of the polar circulation nucleus is qualitatively described; mass transfer within this is effected by large-scale sinking throughout the depth of the 20-km atmospheric column studied. (Auth. mod.)

I-35845
Milashenko, G.P., **Trajectories and frequency of cloud vortices in Antarctica from satellite data,** Climate of Antarctica. Papers presented at the All-Union Symposium on the Study of the Climate in Antarctica. Edited by I.M. Dolgin, New Delhi, Oxonian Press, 1986, p.208-213, For Russian original see 12I-24463. 4 refs.

Distribution of trajectories and recurrence of cyclonic cloud eddies in Antarctica from 1970-1974 is calculated. Two circular branches of trajectories were identified. Meridional trajectories end in East Antarctica, as a rule, near the coast. Areas of maximum frequency of cyclonic cloud eddies occur in conjunction with trajectories and maximum cloud cover. (Auth. mod.)

I-35877
Kazarian, R., **Alarming depletion of ozone layer above Antarctica: scientists seeking cause,** *Environmental conservation,* Summer 1986 13(2), p.178.

Four teams of scientists making a midwinter flight to Antarctica in August 1986 to try to determine the cause of alarming annual deviations in the protective layer of ozone above the continent are briefly discussed, as is some background of the problem itself.

I-35881
Mo, K.C., Pfaendtner, J., Kalnay, E., **GCM study on the maintenance of the June 1982 blocking in the Southern Hemisphere,** *Journal of the atmospheric sciences,* Apr. 15, 1987 44(8), p.1123-1142, 36 refs.

General Circulation Model (GCM) experiments have been performed to determine mechanisms that maintained the blocking episode in the Australian-New Zealand region during the period June 8-22, 1982. A control forecast reproduces the persistent ridge. Several mechanistic experiments lead to the following conclusions: the block was not due to orographic forcing, which has only a small local influence on the winter atmospheric circulation in the Southern Hemisphere; the block was not produced by the sea surface temperature anomalies (SST); the block was not a response to tropical heating or the Asian Monsoon; the most important boundary forcing maintaining this blocking ridge is heating associated with the land-sea contrast; the daily spectral energetics of the control experiment suggests that the baroclinic amplification of planetary-scale waves forced by synoptic-scale disturbances played an important role in the evolution of this blocking process. High-latitude sensible heating associated with cold air outbreaks from Antarctica are also important in maintaining the block. (Auth. mod.)

I-35885
Shell, E.R., **Watch this space,** *Omni,* Aug. 1987 9(11), p.36-42, 80-81.

The history of the discovery, possible consequences, and research related to stratospheric ozone losses over Antarctica are reviewed. The NASA plan to fly a group of pilots into the heart of the antarctic vortex, to take samples of the hole and gather data to help experts on the ground determine how much ozone has vanished and what chemical process is involved, is described. Nine pictures, generated by the Nimbus 7 total ozone mapping spectrometer showing the Southern Hemisphere ozone hole expanding over a period of time from Sep. 16 to Oct. 2, 1986, are included.

I-35887
Uruguay. Dirección Nacional de Meteorología, **Meteorological investigations in Antarctica** [Investigación científico-meteorológica en la Antártida], *Montevideo. Instituto Antártico Uruguayo. Actividad científica, 1985/86,* Mar. 20, 1987 Vol.1, p.10-12, In Spanish with English summary.

Uruguay's research activities in the Antarctic are carried out by the National Meteorology Directorate in coordination and cooperation with the Uruguayan Antarctic Institute, whose principal aim is to identify the typical synoptic configurations which evolve over the southern part of South America and their relation to meteorological phenomena which occur in Uruguay. As a part of program implementation, the meteorological station Dinamet-Uruguay was installed at the Artigas Station on King George I. A table showing climatological data for Mar. 1 through July 31, 1986, is included in an appendix.

I-35899
Van der Veen, C.J., **Ice sheets and the CO2 problem,** *Surveys in geophysics,* Mar. 1987 9(1), p.1-42, Refs. p.40-42.

In this review, the carbon dioxide problem is discussed, with special reference to the possible effects of a global warming on the ice sheets of Greenland and Antarctica. Instead of detailed projections of future climate and the consequences, the basic mechanisms are explained and illustrated with results described in the literature. It is concluded that a doubling of the atmospheric CO2 content (most likely to occur somewhere in the second half of the next century) will result in a globally-averaged warming of 2-4 C, and an intensification of the hydrologic cycle. In the polar regions, this warming will be a few degrees larger and as a consequence the Greenland Ice Sheet will decrease in size. Antarctica, on the other hand, is expected to grow because of the increased snowfall. The instability of the West Antarctic Ice Sheet is also discussed and, although no conclusive prediction to its long-term response can be made, it is argued that on a short time scale (less than about 100 y) nothing dramatic will happen to this part of Antarctica. (Auth.)

I-35937
Lysakov, E.P., **Atmospheric circulation in the Atlantic sector of the southern ocean according to results of the "Weddell-POLEX-81" expedition** [Atmosfernaia tsirkuliatsiia nad atlanticheskim sektorom IUzhnogo okeana (rezul'taty eksperimenta "Uedell-POLEX-81")], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.45-49, In Russian.

Results of monitoring atmospheric circulation over the central portion of the Atlantic sector of the southern ocean, from Oct. 18 through Nov. 15, are presented. Basic findings, related to the intensity of zonal vs. meridional circulation, cloudiness, cyclonic systems, pack ice, and formation of polynyas, are discussed.

I-35938
Lutsenko, E.I., **Disruption of zonal atmospheric circulation over the southern ocean** [O narusheniiakh zonal'nosti atmosfernoĭ tsirkuliatsii nad IUzhnym okeanom], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.49-52, In Russian. 5 refs.

Areas with most active development of blocking processes in the Southern Hemisphere are discussed, based on analysis of the properties of spatial amplitude distribution of annual pressure variations over the ocean, which is shown on a chart along with the position of main climatic cyclone centers.

I-35939
Lysakov, E.P., Sveshnikov, A.M., **Influence of atmospheric circulation on the formation of Weddell polynya** [O vliianii atmosfernoĭ tsirkuliatsii na formirovanie polyn'i Ueddella], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.52-56, In Russian. 2 refs.

A table showing the meridional pressure gradient in the 50-65 deg S zone over the Atlantic sector of the southern ocean, for the periods 1971-1973, 1974-1976 and 1977-1979, is discussed. The conclusion is derived from the above analysis, based mainly on the annual variations of wind currents in the Maud Rise region, that such currents have a definite influence on the formation of polynyas in that area.

I-35940
Lutsenko, E.I., **Structure of atmospheric processes and its relation to some oceanographic features in the Atlantic Ocean** [Struktura atmosfernykh protsessov v sviazi s nekotorymi okeanograficheskimi osobennostiami atlanticheskogo sektora IUzhnogo okeana], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.56-61, In Russian. 7 refs.

Atmospheric processes were studied in the Atlantic and Indian oceans around the Antarctic Peninsula and along the southern coast of the continent. Charts showing the recurrence (number of events) of migratory cyclones in Jan. 1984 and the primary zone of cyclogenesis, as well as the pressure distribution at sea level on Jan. 19, 1984, are presented and discussed. Zonal circulation patterns are more frequently broken in winter than in summer; cloud vortices occur twice as frequently in winter as in summer. Their number is greatest at latitude 50-60S.

I-35941
Vasil'ev, V.F., Romanov, V.F., **Meso- and macroscale air-sea interaction processes in the South Atlantic Ocean** [Mezo- i makromasshtabnoe vzaimodeĭstvie atmosfery i okeana v IUzhnoĭ Atlantike], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.62-67, In Russian. 4 refs.

A scheme of local and macroscale energy parameters, in the Weddell Sea polynyas, is presented and discussed. It includes the following: sea ice thickness; spatial distribution and density of atmospheric-boundary-layer internal energy; spatial distribution of turbulent heat flow; surface pressure, surface temperature and temperature at 850-Mbar level; spatial density distribution of potential and kinetic energy; and spatial distribution of vertical Ekman currents

I-35942
Makshtas, A.P., Bogorodskiĭ, P.V., Andreas, E.L., **Small-scale interaction between atmosphere and ocean at Maud Rise** [Melkomasshtabnoe vzaimodeĭstvie atmosfery i okeana v raĭone podniatiia Mod], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.67-71, In Russian. 6 refs.

Experiments to determine the heat balance between atmosphere and the southern ocean in winter, conducted jointly by Soviet and American scientists during the "Weddell-POLEX-81" expedition, are described. The balance structure is analyzed; results obtained allowed to draw, and present, detailed charts of the heat processes in the atmospheric boundary layer.

I-35948
By radio from Antarctica [Po radio iz Antarktiki], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.92-95, In Russian.

Presented is a month-by-month table of meteorological data—atmospheric pressure and temperature, wind speed, relative humidity and cloudiness—recorded at each of the 7 Soviet stations from Jan. through Dec., 1984.

I-35951
Lal, M., Jain, A.K., Sinha, M.C., **Possible climatic implications of depletion of antarctic ozone,** *Tellus,* July 1987 39B(3), p.326-328, 12 refs.

The total amount of ozone overhead in late winter and early spring has decreased considerably during the past decade. Recent satellite data confirm that the column abundances of ozone above Antarctica are among the lowest recorded anywhere on the globe. Our radiative-convective model calculations demonstrate that this depletion of antarctic ozone could lead to a surface cooling of about 0.47K which is in contrast to that observed from climatological temperature records. This calls for a detailed investigation of the air chemistry in relation to dynamic-radiative balance for the antarctic atmosphere. (Auth.)

I-35954
Cicerone, R.J., **Changes in stratospheric ozone,** *Science,* July 3, 1987 237(4810), p.35-42, Numerous refs.

The ozone layer in the upper atmosphere is a natural feature of the earth's environment. It performs several important functions, including shielding the earth from damaging solar ultraviolet radiation. Far from being static, ozone concentrations rise and fall under the forces of photochemical production, catalytic chemical destruction, and fluid dynamical transport. Human activities are projected to deplete substantially stratospheric ozone through anthropogenic increases in the global concentrations of key atmospheric chemicals. Human-induced perturbations may be occurring already.

I-35974
Jacka, F., **Proposal for study of the dynamics, energetics and chemistry of the stratosphere over Mawson, Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.221-225, 5 refs.

It is proposed that studies on the dynamics, energetics and chemistry of the stratosphere be initiated at Mawson Station using a lidar to measure density, temperature and wind velocity, and high resolution spectroscopic or lidar techniques to measure some of the chemically active minor constituents, especially ozone. It is suggested that this work should be developed also as a contribution to the world-wide monitoring of long-term stratospheric changes, and to the study of sun-weather relationships. (Auth.)

I-35975

Jacka, F., Argall, P.S., **Lidar system for stratosphere studies—Performance simulation,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.226-235, 9 refs.

A brief description is presented of a lidar system which is currently under construction. This lidar will be used to study the structure and dynamics of the atmosphere in the height range 5 to 70 km; its expected performance is discussed. The simulations presented here relate to determinations of density, temperature and wind from the back-scattered intensity; and wind and temperature from the line profile of the back-scattered light. Attention is drawn to the importance of the lidar technique for application in the Antarctic, along with existing facilities, especially if it is combined with measurements on the active minor constituents of the stratosphere. (Auth.)

I-36012

Lockwood, J.G., **Ice calving, carbon dioxide and control of ice ages,** *Progress in physical geography,* 1985 9(1), p.89-96, 26 refs.

The literature on ice calving, carbon dioxide, and the control of ice ages published during the past decade is reviewed. Various ice sheet models for the last 100 yr are grouped into 3 types, and the results of their use in studying past climates are reviewed. The variation in atmospheric carbon dioxide content during the last glacial-to-interglacial climatic transition is revealed by Greenland and antarctic ice cores and deep sea cores. The atmosphere-ocean carbon dioxide cycle and the effect of CO2 on climate and ice sheet melting are reviewed. It is concluded that variations in atmospheric CO2 may provide an additional, or alternative, mechanism to Pollard's ice sheet calving mechanism for causing the rapid retreat of continental ice sheets.

I-36013

Japanese Antarctic Research Expedition, **Antarctic meteorological data. Vol.26. Meteorological data at the Syowa Station in 1985,** Tokyo, Japan Meteorological Agency, [1987], 258p.

This set of 1985 data collected at Showa Station includes surface reports comprised of monthly and daily summaries and synoptic data: aerological data comprised of monthly summaries and upper air observations; global solar radiation measurements comprised of monthly summaries and hourly readings; and atmospheric turbidity measurements comprised of daily, monthly, and extreme readings.

I-36014

Japanese Antarctic Research Expedition, **Antarctic meteorological data. Special volume No.4. Total amount of ozone (1981-1985); vertical ozone (sonde) (1981-1984); long wave radiation (1981-1983),** Tokyo, Japan Meteorological Agency, [1986], 60p., 3 refs.

This volume contains atmospheric ozone and long wave radiation data at Showa Station for the period 1981-1985. The atmospheric ozone data are divided into vertical and total values; the former were obtained with ozonosondes and the latter with ozone spectrophotometers. Long-wave radiation data were obtained with long wave radiation sondes. The types of instruments are listed and illustrated.

I-36026

Jones, P.D., Limbert, D.W.S., **Data bank of antarctic surface temperature and pressure data,** *U.S. Department of Energy. Technical report,* June 1987 DOE/ER/60397-H2, 52p., 19 refs.

A data bank of monthly mean surface air temperature and sea-level or station-level pressure is presented for 29 stations over the antarctic region south of 60 S. Considerable attempts have been made to locate missing data in nationally published sources and in World Weather Records. By cross-checking neighboring station data, suspect values have been either verified or corrected. At 4 sites in the Antarctic Peninsula region, composite records were produced by amalgamating records from a number of short and longer length records at or near the key sites. The 4 sites were Bellingshausen, Faraday, Esperanza and Rothera. The mean antarctic temperature series produced by Raper et al. (1984) is updated using the same method of calculation. (Auth.)

I-36052

Krüger, B.C., Wang, G., Fabian, P., **Antarctic ozone depletion caused by heterogeneous photolysis of halogenated hydrocarbons,** *Geophysical research letters,* May 1987 14(5), p.523-526, 17 refs.

Corresponding to measurements made in the Arctic, assumptions have been made on the atmospheric concentrations of reactive halogenated hydrocarbons in Antarctica. These concentrations have been used in a one-dimensional photochemical model calculation carried out for antarctic conditions. When the photolysis rates of these compounds are increased, which is likely to be expected due to an acceleration by heterogeneous photolysis, total ozone columns are calculated well in agreement with the recently observed low antarctic ozone values. (Auth.)

I-36053

Krueger, A.J., Schoeberl, M.R., Stolarski, R.S., **TOMS observations of total ozone in the 1986 antarctic spring,** *Geophysical research letters,* May 1987 14(5), p.527-530, 9 refs.

Total ozone measurements by the Total Ozone Mapping Spectrometer (TOMS) aboard the Nimbus 7 satellite show the reappearance in 1986 of the extreme springtime antarctic ozone minimum during Sep. and Oct. The minimum total ozone amounts descended to 156 Dobson Units; the minimum Oct. average of 185 DU was 27 DU higher than the corresponding average in 1985 and 5 DU less than the 1984 average. This behavior indicates a pause in the downward trend of recent years. (Auth.)

I-36054

Saxena, V.K., Ruggiero, F.H., **Microstructure of antarctic coastal clouds,** International Cloud Physics Conference, 9th, Tallin, Aug. 21-28, 1984. Proceedings, Vol.1, Tallin, Valgus, 1984, p.51-54, 19 refs.

During Oct.-Nov. 1980 and Dec. 1982-Jan. 1983, the Cloud Aerosol Interaction Lab (CAIL) of North Carolina State University participated in field experiments over the antarctic coast for investigating the cloud microstructure. In particular, measurements of the microphysical parameters of antarctic coastal stratus clouds were made. The objective of the field study were determination of the cloud nucleation characteristics of aerosols particles that participate in the formation of antarctic coastal clouds, and study of variations in the cloud droplet size spectra through direct measurements within the clouds. Observations of the activity spectrum of cloud condensation nuclei in the substratus layer with simultaneous observations of cloud droplet size distribution were used to analyze recent models proposed for the evolution of the cloud droplet spectra. This is accomplished by examining the correlation between the CCN activity spectrum and the droplet size spectrum. (Auth. mod.)

I-36059
Iwasaka, Y., Ono, T., Nomura, A., **Lidar measurements of antarctic stratospheric aerosols during 1983, 1984 and 1985: effect of volcanic eruption of El Chichón,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 9th, 1986, edited by M. Ejiri, p.56-61, 18 refs.

Measurements of stratospheric aerosols were carried out at Showa Station in 1983, 1984 and 1985. The volcanic eruption of El Chichón (spring 1982, Mexico) possibly disturbed the antarctic winter stratosphere. The decay time scale of the volcanic ash enhanced aerosol layer is about 9 months. (Auth.)

I-36060
Nomura, A., **Lidar observation of the mesospheric sodium layer in Antarctica: preliminary result,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 9th, 1986, edited by M. Ejiri, p.62-66, 12 refs.

This report describes the lidar measurement of mesospheric sodium layer made at Showa Station in 1985. The result does not show any pronounced seasonal variation in sodium abundance. Auroral activity may have disturbed the sodium layer significantly. (Auth.)

I-36083
Russell-Head, D.S., Budd, W.F., **Casey snow runway meteorological records, 1984,** *Melbourne. University. Programme in Antarctic Studies. MUPAS report,* June 1987 No.66, 98p.

This report consists of the set of meteorological and glaciological data collected at site of the proposed Casey Station compressed snow runway during Jan. and Feb. 1984. The data is presented in numerical and graphical form. The parameters measured are air temperature, snow temperatures at depths of 0.1 m, 0.2 m, 0.5 m, and 1.0 m, solar radiation, wind speed and direction. The data were collected every 15 minutes from 19 Jan. to 8 Feb. Snow temperatures from 19 to 25 Jan. are not reliable because the snow in which the sensors were buried had become contaminated by ash from a fire. The snow temperatures from 29 Jan. were recorded in virgin firn and are reliable. Apart from the problems with the snow temperatures, the data set is fairly complete and forms a good record of the local meteorological conditions. (Auth. mod.)

I-36102
Smith, V.R., **Chemical composition of precipitation at Marion Island (sub-Antarctic),** *Atmospheric environment,* 1987 21(5), p.1159-1165, Refs. p.1164-1165.

Over a 1-year period 16.40 g Cl/sq m, 10.35 g Na/sq m, 2.11 g SO4-S/sq m, 1.24 g Mg/sq m, 0.39 g K/sq m, 0.37 g Ca/sq m and 0.21 g inorganic N/sq m were deposited in precipitation 450 m inland on the eastern coastal plain of Marion I. Dissolved PO4-P and organic forms of N were not detected in the precipitation samples. Concentrations of Cl, Na, Mg, Ca and K, as well as the total ionic concentration in the precipitation samples were significantly negatively correlated with the amount of precipitation. The ionic concentration order (Cl>Na>SO4-S>Mg>K=Ca) in the precipitation was very similar to that in the surrounding ocean. It is likely that most of the inorganic N found in the precipitation originated in penguin rookeries in the nearby shore zone. A comparison is made between precipitation inputs of nutrients at the island and those at other subpolar sites in the S and N Hemispheres. (Auth.)

I-36116
King, J.C., Mobbs, S.D., Darby, M.S., Rees, J.M., **Observations of an internal gravity wave in the lower troposphere at Halley, Antarctica,** *Boundary-layer meteorology,* Apr. 1987 39(1/2), p.1-13, 11 refs.

Observations of internal gravity waves in the stably-stratified atmospheric boundary layer at Halley Station are presented. These were made on Feb. 1, 1986 and take the form of temperature measurements from a 30 m mast and a Sodar record. The temperature record shows a clearly defined, dominant wave period of around 11 min. A high-resolution radiosonde ascent made during the period of wave activity exhibits thin layers of low Richardson number and it is suggested that these are regions of dynamic instability where the waves are generated. A linear stability analysis of the radiosonde data supports this idea. It is argued from simple theoretical ideas and by means of a numerical model that only waves with a wavelength greater than a certain critical value are likely to be observed at the surface. The observations are shown to be consistent with this hypothesis. (Auth.)

I-36125
Kratke, J., Wielbińska, D., **Vertical wind profile under small velocity conditions over Admiralty Bay, King George Island, West Antarctica,** *Polish polar research,* 1987 8(1), p.75-83, 9 refs.

The analysis of speed and direction distribution of upper wind in the layer up to 3500 m was carried out on the basis of pibal ascents performed over the Admiralty Bay. Results show that with northwesterly, westerly and southwesterly winds the velocities increase with height. Surface wind velocities are greater than in the 100-300 m layer; minimum velocities are also observed at 1300-1700 and at 2200 m. A considerable number of days with easterly air flow occur in the Antarctic Peninsula. (Auth. mod.)

I-36155
Brasseur, G., **Endangered ozone layer,** *Environment,* Jan./Feb. 1987 29(1), p.6-11, 39-45, 25 refs.

The report in 1985 of a springtime "ozone hole" in the stratosphere above Antarctica stimulated new programs of research on atmospheric chemistry and dynamics. It also triggered widespread popular speculation as to the causes and effects of whatever processes accounted for the hole. This article reviews the present state of knowledge, the major uncertainties about what is happening, and the array of hypotheses put forward to explain these events and their implications for the future. (Auth.)

I-36157
Bojkov, R.D., **Spring-ozone change in Antarctica and the role of the polar vortex,** *Advances in space research,* 1986 6(10), p.89-98, 15 refs.

Observations since the late 1970's have shown that from late Sep. until the end of Nov. the total ozone over the southern polar region has declined by up to 30% when compared with the ozone average of the 1957-1978 period. Satellite observations confirm that the significant ozone decline is centered over and does not expand outside of the antarctic continent, e.g. it coincides with the location of the antarctic stratospheric winter vortex; moreover, the decline increases poleward. Analysis of the stratospheric temperatures and geopotential heights confirms that the spring-to-spring ozone changes closely follow the changes of the thermobaric field, and that the rapid increase of ozone (and stratospheric temperature) in the spring is dependent on the time of the polar vortex breakdown, when favorable conditions for continuous meridional exchange of ozone-rich air from the middle vortex central region during early spring provide favorable conditions for weak upward motions, responsible for a substantial part of the ozone loss between the date of the solar penetration of the stratos-

phere, and the date of the vortex breakdown. Since the late 1970's, the breakdown of the antarctic vortex has occurred about mid-Nov., a month later than in years of early breakdown. It is suggested that an early breakdown of the antarctic vortex would interrupt the trend of declining spring ozone established over the past few years. (Auth.)

I-36160

Mount, G.H., Sanders, R.W., Schmeltekopf, A.L., Solomon, S., **Visible spectroscopy at McMurdo Station, Antarctica. 1. Overview and daily variations of NO2 and O3, austral spring 1986,** *Journal of geophysical research,* July 20, 1987 92(D7), p.8320-8328, 27 refs.

Observations of the visible spectra of the sun and moon were obtained at McMurdo Station, Antarctica, during austral spring in 1986. The data coverage and observing conditions are described. Daily variations of ozone suggest that the bulk of the springtime ozone depletion (or the antarctic ozone "hole") occurs rapidly during early Sep. Total NO2 abundances were remarkably low during Aug. and Sep. inside the polar vortex and displayed a near-absence of diurnal variation from morning to evening twilight. The total NO2 column abundance was closely correlated to 50-mbar temperatures. (Auth.)

I-36161

Solomon, S., Mount, G.H., Sanders, R.W., Schmeltekopf, A.L., **Visible spectroscopy at McMurdo Station, Antarctica. 2. Observations of OClO,** *Journal of geophysical research,* July 20, 1987 92(D7), p.8329-8338, 24 refs.

The column abundance of OClO at McMurdo Station, Antarctica, was measured by visible absorption spectroscopy during austral spring in 1986. Observations were obtained during the day using scattered sunlight and at night using direct light from the moon. The observed total column amounts in Antarctica were about 20-50 times larger than would be expected for standard homogeneous photochemistry, suggesting that the halogen chemistry of antarctic spring is profoundly different from such standard theoretical expectations and may play a role in the development of the springtime antarctic ozone "hole."

I-36162

Sanders, R.W., Solomon, S., Mount, G.H., Bates, M.W., Schmeltekopf, A.L., **Visible spectroscopy at McMurdo Station, Antarctica. 3. Observations of NO3,** *Journal of geophysical research,* July 20, 1987 92(D7), p.8339-8342, 16 refs.

The total column abundance of NO3 was measured in Antarctica during the nights of Sep. 17-19, 1986, by visible absorption, using the moon as the light source. The variation of the observed abundance with lunar zenith angle suggests that the bulk of the layer is located in the stratosphere. In agreement with theoretical model calculations, the total column was about 20 trillion molecules/sq km and increased systematically with time during the night. (Auth.)

I-36188

Wendler, G., **"Radiation paradox" on the slopes of the antarctic continent,** *Polarforschung,* 1986 56(1/2), p.33-41, With German summary. 19 refs.

Detailed radiative measurements were carried out during the austral summer of 1985/86 in Adélie Land, Eastern Antarctica. The station was located some 100 km from the coast at an altitude of 1560 m on the slope of the Antarctic Ice Sheet. It was found that with increasing global radiation the all wave radiation budget decreased. Similar results in Greenland were called the "radiation paradox". Prerequisite for this occurrence is a high surface reflectivity. A mean albedo of 82% was observed at the site. Under these circumstances, the increase in the sort wave radiation with decreasing cloudiness is over-compensated by the increased long wave radiative losses. A simple model was developed which showed that under these conditions, an albedo above 60.1% had to be present to observe this phenomenon. (Auth.)

I-36189

Raschke, E., Jacobs, H., Lutz, H.-J., Steffens, U., **Identification of clouds over Antarctica from satellite imagery** [Wolkenerkennung über der Antarktis in Satellitenbildern], *Polarforschung,* 1986 56(1/2), p.69-78, In German with English summary. 14 refs.

Detailed analyses of the multispectral data of the AVHRR in the operational NOAA satellites demonstrate their usefulness to map clouds even over the highly reflecting snowfields of Antarctica. With this procedure a contrast enhancement is performed making use of the different spectral reflectance, transmittance and emittance properties respectively, of clouds and the surface below within the spectral ranges of the AVHRR. The measurements within the range between 3.5 and 3.9 micron (channel 3), which unfortunately are highly noisy during night-time, play a key role here. Results of some initial case studies demonstrate that a computer-aided identification of water and ice clouds over Antarctica and adjacent ocean and sea-ice fields is possible, where even sea-ice beneath optically thinner cloud-decks can be mapped. This procedure should be useful for operational use to analyze ISCCP data sets. (Auth.)

I-36190

Wada, M., **Formation mechanisms of clouds during high pressure conditions in the coastal region of Antarctica,** *Meteorological Society of Japan. Journal,* June 1987 Ser.II,65(3), p.483-495, With Japanese summary. 15 refs.

Analyzing the aerological data at Showa Station and the surface data at Showa Station and Mizuho Stations in 1979, the mechanism of cloud formation during high-pressure conditions is discussed. It was frequently (over 30%) overcast during high-pressure conditions at Showa except in Dec., and a similar tendency can be found at Mizuho. Moreover, snowfalls were observed at Showa even in these conditions and the frequency of such days was rather larger in winter than in summer. In many cases of high-pressure, a stable layer or an inversion layer was found; some stable layers were around the 800 mb level and others were near the surface. It was considered that the formation and development of clouds was connected directly with the stable layers. The main mechanisms for forming clouds would be the weak convection in the layer below a stable layer or inversion layer, the mixing of cold air with moist air because of wind shear and surface radiative cooling; for developing clouds the mechanism would be radiative cooling at the cloud top. (Auth.)

I-36191

Sinclair, M., comp, **Antarctic weather,** Christchurch, New Zealand, Department of Scientific and Industrial Research, [1987], 6 leaves.

This short booklet gives a thumbnail sketch of some of the better known features of the antarctic climate. It speaks to temperatures, wind, weather, blizzards, whiteout, and sunlight hours.

I-36195

Lysakov, E.P., **Localization of meridional disturbances of the atmospheric circulation in the Antarctic** [Lokalizatsiia meridional'nykh vozmushcheniĭ atmosfernoĭ tsirkuliatsii nad Antarktidoĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.81, p.45-50, In Russian. 3 refs.

Through the analysis of the trajectories of cloud vortexes and the distribution of frontal cloudiness it is found that the strongest meri-

dional disturbance of the atmospheric circulation occurs in the Pacific sector and over Marie Byrd Land. It is suggested that this part of the coast is the source of energy supply to the atmospheric column over Antarctica, through the incorporation of warm and humid masses, and their subsequent distribution over the continent.

I-36196
Sokolov, S.T., **Strong winds in the Molodezhnaya Station area in 1979** [Sil'nye vetry v raĭone AMTs Molodezhnaia v 1979g.], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.81, p.50-63, In Russian. 8 refs.

The aerosynoptic conditions of the formation and development of strong winds, divided into cyclonic and katabatic, at Molodezhnaya Station are described and analyzed. Cyclonic trajectories during southeasterly katabatic winds are illustrated. Tables showing the maximum wind speed distribution during 1979 are presented.

I-36197
Sokolov, S.T., **Meteorological conditions at Druzhnaya Base in summer 1980** [Meteorologicheskie usloviia v raĭone bazy Druzhnoĭ letom 1980 g.], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.81, p.63-77, In Russian. 7 refs.

Meteorological characteristics and synoptic processes over the southern Weddell Sea and the adjacent Filchner and Ronne ice shelves, in Jan.-Mar. 1980, are described. The data are compared with data obtained in previous years. Significant influence on the relatively mild climate of West Antarctica is attributed to topographic features of the area, such as the Pensacola Mountains, the mountains of the southern Antarctic Peninsula, and Berkner I.

I-36202
Kodama, Y., **Katabatic winds in Adélie Land,** Fairbanks, University of Alaska, 1985, 191p., University Microfilms order No.87-04873, Ph.D. thesis. Refs. p.181-191.

Data from Automatic Weather Stations (AWS) on Adélie Land were analyzed, showing the following: the high directional constancy of surface winds was found at the slope stations even in summer, when the inversion is weak or destroyed; synoptic geostrophic winds and eddy viscosity also effect the constancy of the wind direction in summer; wind directional constancies at the slope stations in winter are sometimes lower than the mean annual constancies. These low constancies are associated with warm air advection from maritime air brought into Adélie Land, when the continental anticyclonic ridge lies to the east of it. There is a superadiabatic surface temperature change between the high plateau and intermediate plateau stations, which could be of importance for surface flow when the buoyancy component is balanced or nearly balanced by an increase in depth of the katabatic wind layer. The entrainment of blowing snow particles increases the density of the katabatic flow layer by 2 mechanisms: the addition of snow particles to the air column, and the sublimation of the snow particles. This increase in density in the katabatic flow layer leads to increased wind speed, which occurs primarily at wind speeds exceeding 12 m/s when there is, usually, a large amount of blowing snow. (Auth. mod.)

I-36220
Elliott, S., Rowland, F.S., **Chlorofluorocarbons and stratospheric ozone,** *Journal of chemical education,* May 1987 64(5), p.387-391, 8 refs.

The physical atmospheric chemistry behind chlorofluorocarbon-ozone relationships is reviewed, first from a historical perspective, and then with consideration of the ozone hole discovered over Antarctica. It is noted that ozone hole development closely coincides with the rise in atmospheric chlorine content induced by CFC emission. However, it is emphasized that any mechanism relating chlorine and the ozone hole must be unique to the Antarctic. The role of clouds in the chlorine mechanisms advanced so far is discussed.

I-36234
Aleksandrov, A.S., **Inspection of Mirnyy Station** [Inspektsiia meteorologicheskoĭ stantsii Mirnyĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.80, p.143-144, In Russian. 1 ref.

An inspection of Mirnyy Station during the 23rd Soviet Antarctic Expedition is described. It included a reconnaissance of the station grounds, equipment, meteorological instruments, personnel, and evaluation of the data collected. The inspection showed that the topography of the station location is typical of that region and well suited for long-term meteorological observations. However, the construction sites surrounding the meteorological platform impair those observations by greatly obstructing the horizon, especially on the northwestern side. Consequently, data on snow cover thickness, solar radiation, and direction and speed of wind often reflect a local, rather than a general, meteorological regime.

I-36255
Albuquerque Cavalcanti, I.F. de, **Interaction between Antarctica and the atmospheric circulation near South America** [Interações entre a Antártica e a circulação da atmosfera próxima à América do Sul], *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.171-179, In Portuguese with English summary. 17 refs.

Features of atmospheric circulation near South America are analyzed and related with variations of meteorological parameters to some regions of Antarctica. The empirical orthogonal functions method is applied and the eigenvectors patterns are related to synoptic situations that affect South America. Pressure in Antarctica shows similar variations to the 4th circulation eigenvector. When pressure is higher in Antarctica, the jet stream is in lower latitudes, and the synoptic systems tend to pass over Brazil. (Auth.)

I-36256
Pereira, E.B., Nordemann, D.J.R., Vasconcellos, M.B.A., **Atmospheric radon measurements in the Antarctic Peninsula: a preliminary report,** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.181-186, 17 refs.

Atmospheric radon and radon daughter products were measured on board the *Barão de Teffé* cruising from King George I. to the Brazilian coast in summer 1983-1984. An average of 2.1 pCi/cu m was obtained for radon in the Antarctic Peninsula region. The Drake Passage contributed with only 1.3 pCi/cu m. Large short term fluctuations superimposed on a slow steady concentration decrease with time emphasized the need of additional long-term data for more thorough studies. The radon daughters collected on aerosol filters kept the same long-term concentration decrease with time but no short-term correlations were found. INAA performed on returned filters conformed the expected preferential maritime origin of these aerosols with an average Cl/Na of 1.83. (Auth. mod.)

I-36257
Villela, R.J., **Results of synoptic analysis aboard R/V *Prof. W. Besnard* in the 1st and 2nd Brazilian antarctic expeditions,** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.187-204, 15 refs.

Surface synoptic charts were analyzed daily aboard R/V *Prof. W. Besnard* during the 1982-83 and 1983-84 summer seasons. Plotted were surface and upper air analyses and prognostic charts transmitted in coded forms by Chilean and Argentine forecasting offices, and by Frei Antarctic Meteorological Center. The onboard radio equipment and the sources of meteorological data broadcasts are described.

Several selected synoptic situations are discussed in detail. The Drake Passage conditions and the evidences found for the low-level cold inertial jet stream in the Antarctic Peninsula area (as described by Parish and Schwerdtfeger, 1977) are particularly stressed. A probable link between synoptic systems in the Antarctic and cold fronts in Brazil observed in Jan. 1983 is discussed. (Auth. mod.)

I-36258

Villela, R.J., Festa, M., **Meteorological observations aboard R/V *Prof. W. Besnard* during the 1st and 2nd Brazilian antarctic expeditions,** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.205-218, 8 refs.

Results of surface meteorological observations made aboard R/V *Prof. W. Besnard* during the 1st and 2nd Brazilian antarctic expeditions are reported. The extreme and mean values, and frequencies of several elements observed south of 60 S are presented and discussed. More adverse conditions, such as strong winds, snow, rain and fog, were observed in the first phase of the 1st expedition (Jan. 8 to 19, 1983) and in the second phase of the 2nd expedition (Feb. 19 to 25, 1984). Fewer icebergs were seen in the 2nd expedition than in the 1st. The cold, low-level inertial jet stream around the northeastern extremity of the Antarctic Peninsula, originating in the Weddell Sea appeared to be related to some of the colder temperatures observed from the ship. (Auth. mod.)

I-36288

Flohn, H., **Role of large-scale ice sheets in climatic history,** *International Association of Hydrological Sciences. Publication,* 1987 No.170, International Symposium [on] the Physical Basis of Ice Sheet Modelling, Vancouver, B.C., Aug. 9-22, 1987. Proceedings. Edited by E.D. Waddington and J.S. Walder, p.231-241, Refs. p.239-241., With French summary.

The climatic history of the earth contains two periods of some 10,000,000 years length during which a continent in polar latitudes was partly or totally glaciated, while the opposite hemisphere was essentially ice-free. The present glaciation of Antarctica started about 38 Ma BP, preceding those of the northern continents by more than 30 MA. The climatogenetic role of this hemispheric asymmetry is outlined, as well as the role of variations in the composition of the atmosphere. Together with the varying land-sea distribution in polar latitudes, the latter primarily control the climatic history of the planet Earth. (Auth.)

I-36302

Anderson, A., **Expedition faces antarctic ozone hole mysteries,** *Nature,* Aug. 6-12, 1987 328(6130), p.463.

Plans are outlined for an international expedition to investigate Antarctica's ozone hole, from specially instrumented high flying aircraft capable of reaching the center of the hole, during Aug.-Sep., 1987. The data will be processed at Punta Arenas, Chile, as soon as received, and a report of the findings is to be produced by Oct. 1.

I-36303

Lemonick, M.D., **Heat is on,** *Time,* Oct. 19, 1987 130(16), p.58-67.

The gathering in Punta Arenas, Chile, Aug.-Sep. 1987, of 120 mostly American scientists and technicians, with the purpose of carrying out an investigation of Antarctica's ozone hole, is reported. Chemical processes which may be involved in the destruction of ozone are described in detail, and illustrated, as are the steps—from preflight preparation to landing—and comments of the pilots who flew the 12 missions through the antarctic ozone hole in their specially equipped ER-2 high-altitude research aircraft.

I-36320

Hills, A.J., Cicerone, R.J., Calvert, J.G., Birks, J.W., **Kinetics of the BrO+ClO reaction and implications for stratospheric ozone,** *Nature,* July 30, 1987 328(6129), p.405-408, 15 refs.

The gas-phase reaction between BrO and ClO has been proposed as a potentially fast and synergistic mechanism of stratospheric ozone destruction. Further, it has been advanced as a contributing factor to antarctic springtime ozone column losses of about 40% from 1960 to 1985. Both dynamical and chemical theories have been advanced to explain the formation of the antarctic 'ozone hole'. A major uncertainty in these theories has been the rate constant and product distribution of the BrO+ClO reaction as a function of temperature. Reported here are the first direct measurements of these parameters. It is shown that this reaction could, indeed, account for a large fraction of the springtime ozone depletion over Antarctica and provide a source of chlorine dioxide of sufficient magnitude to explain the recent measurements of this species in the antarctic stratosphere, provided that the stratosphere contains a sufficient quantity of bromine (about 20 p.p.t.v.). (Auth.)

I-36321

De Zafra, R.L., **High concentrations of chlorine monoxide at low altitudes in the antarctic spring stratosphere: diurnal variation,** *Nature,* July 30, 1987 328(6129), p.408-411, 19 refs.

The Stony Brook ground-based remote sensing mm-wave spectrometer was used to measure chlorine monoxide in the stratosphere over McMurdo Station during the austral spring of 1986. The data collected show strong evidence for abnormally high concentrations of ClO at low altitudes—as much as two orders of magnitude greater than standard theories predict at 20-km altitude of mid-latitudes. This low-altitude ClO changes cyclically on a diurnal basis, and also secularly during the Sep.-Oct. observing period. A study of this diurnal variation of the low-altitude ClO is presented. It is concluded that chlorine is crucially involved in the springtime destruction of antarctic ozone. (Auth.)

I-36322

Solomon, P.M., **High concentrations of chlorine monoxide at low altitudes in the antarctic spring stratosphere: secular variation,** *Nature,* July 30, 1987 328(6129), p.411-413, 14 refs.

This report covers the secular variation of daytime ClO in the lower stratosphere with a time resolution of 4 or 5 days, during the period Sep. 1 to Oct. 16. It is shown that the ClO concentration declines during the latter half of Sep. and disappears by early Oct. As ClO is directly involved in a catalytic ozone destruction cycle, these observations give evidence that the antarctic ozone hole is caused by a chemical depletion mechanism which operates in the early spring. This is also consistent with models in which large quantities of ClO are maintained through chemical reactions on the surface of polar stratospheric cloud particles which evaporate with the warming of the stratosphere. (Auth.)

I-36323

Heusser, C.J., Rabassa, J., **Cold climatic episode of Younger Dryas age in Tierra del Fuego,** *Nature,* Aug. 13, 1987 328(6131), p.609-611, 36 refs.

Pronounced climatic change during the last glacial maximum is recognized as global in extent, and has been attributed to orbital forcing. Not readily explained in a global context because of the equivocal nature of the evidence are the late-glacial climatic events of short (100-1,000-yr) duration. The cold climate of the Younger Dryas chron (11,000-10,000 yr BP), for example, is known to have been particularly pronounced over the North Atlantic and parts of Europe and North America, whereas in the Southern Hemisphere,

cold conditions for that time are not well established. Evidence is presented for late-glacial climatic cooling in southernmost South America from studies of radiocarbon-dated glacial and pollen stratigraphy at sites along the Beagle Channel in Tierra del Fuego, where a forest-tundra tension zone in the region is especially sensitive to shifting climate. It is concluded that the cold episode corresponds with the time of the Younger Dryas in Europe. The influence of an extension of late-glacial sea ice surrounding Antarctica upon temperatures of the Fuegian archipelago is considered. (Auth. mod.)

I-36324

Oppenheimer, M., **Stratospheric sulphate production and the photochemistry of the antarctic circumpolar vortex,** *Nature,* Aug. 20, 1987 328(6132), p.702-704, 27 refs.

Recent measurements of enhanced ozone depletion in springtime in the antarctic circumpolar vortex were accompanied by observations of unusual behavior of stratospheric aerosol. Enhanced concentrations of condensation nuclei (CN) were observed above 20 km. Some photochemical models predict elevated hydroxyl radical (OH) concentrations in the vortex. It is pointed out that high OH concentrations provide a sufficient source of CN through reaction with carbonyl sulphide (OCS) to account for the observed increase in CN mass. Other mechanisms for CN enhancement are inconsistent with timescales or the vertical structure inferred from aerosol observations. The CN enhancement provides partial support for photochemical models of ozone depletion in the vortex. (Auth.)

I-36334

Darby, M.S., Mobbs, S.D., Brindley, J., **Energy cascades of Kelvin-Helmholtz instabilities in the stably stratified atmospheric boundary layer,** Advances in turbulence. Proceedings of the First European Turbulence Conference, edited by G. Comte-Bellot and J. Mathieu, Berlin, Springer, 1987, p.255-264, 3 refs.

DLC QA 911.E97 1986

A problem of fundamental importance in atmospheric boundary layer theory is that of the nonlinear evolution in space and time of an assemblage of waves. In the boundary layer, these waves occur under conditions of stable stratification, and may be thought of as internal waves, influenced to a greater or less extent by shear. The authors are concerned with an analysis of data obtaiend from the very strongly stratified atmospheric boundary layer which can develop in the antarctic winter night, where several months of darkness allow observations to be made in the absence of the complicating diurnal cycle. Their objectives are twofold; first, to identify the mechanisms by which the observed waves are generated, and secondly, to discover how the energy associated with these mechanisms is redistributed in the domains of wave-number and frequency. (Auth.)

I-36335

Sievers, M.F., Weidner, G.A., Stearns, C.R., **Antarctic automatic weather station data for the calendar year 1986,** Madison, University of Wisconsin, 1987, 268p.

The automatic weather station (AWS) networks provide surface weather observations for specific meteorological experiments on the antarctic continent. At three-hourly intervals the AWS measures air temperature, wind speed and direction at nominal heights of 3 m, and air pressure at the electronics enclosure, usually at a height of 1.5 m above the surface. In addition, some AWS units measure the vertical air temperature difference between 3 and 0.5 m above the surface and relative humidity at 3 m above the surface. Heights above the surface are nominal since snow accumulates after installation. Data transmitted by the AWS are received and stored by the ARGOS data collection system on the NOAA series of polar orbiting satellites. ARGOS data are retransmitted by the satellite and are received and processed to scientific units by a local user terminal at McMurdo. Tables and figures give information about individual studies, their locations, and the principal investigators with affiliation. AWS data are presented as monthly summaries and as daily raw data readings. The report concludes with descriptions of instrument calibration procedures for each element measured and brief reports about each AWS. (Auth. mod.)

I-36352

Monastersky, R., **Antarctic ozone reaches lowest levels,** *Science news,* Oct. 10, 1987 132(15), p.230.

A report is given on a six-week investigation of the ozone depletion over springtime Antarctica. Based at the southern tip of South America and utilizing two aircraft which flew into and under the areas of greatest ozone loss, a team of atmospheric scientists reported that ozone concentration had dropped to half its normal level. The consensus on the reason for the depletion is that it resulted from a combination of meteorological and chemical factors. Details of this view are outlined.

I-36353

Monastersky, R., **More clues to the mysterious ozone hole,** *Science news,* Sep. 19, 1987 132(12), p.182.

A review is given of preliminary results from the first National Ozone Expedition (NOZE 1) at McMurdo in Sep. and Oct. 1986. Possible interpretations of the data are presented but the evidence is not conclusive as to the primary cause of the springtime ozone depletion over Antarctica. The Expedition leader tended to support the chemical explanation for the depletion but emphasized the lack of conclusiveness of the data.

I-36354

Kerr, R.A., **Winds, pollutants drive ozone hole,** *Science,* Oct. 9, 1987 238(4824), p.156-158.

This report deals with observations made during the Airborne Antarctic Ozone Experiment when two aircraft flying from Punta Arenas, Chile, measured the low stratospheric springtime ozone layer over Antarctica. In Aug. and Sep. the two planes flew more than 175,000 km to gather data on the ozone depletion phenomenon. Results of the measurements could not be explained exclusively by either chemical or meteorological factors. Inconsistencies in measurements or sudden changes in ozone concentrations led researchers to conclude that antarctic winter/spring weather conditions enhanced the activity of chlorofluorocarbons which destroy ozone, and changes in the upper atmospheric circulation decreased ozone transport to Antarctica. Exclusivity of either chemistry or meteorology as the sole factor in these depletion events seems to have been ruled out.

I-36367

Cacho Gomez, J., Gil Ojeda, M., Sainz de Aja, M.J., **Ozone hole. Ultraviolet radiation and ozone measurements during the Spanish scientific expedition to Antarctica, 1986-1987** [El agujero de ozono. Medidas de radiación ultravioleta y ozono durante la expedición científica española a la Antártida, 86-87], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.125-136, 17 refs., In Spanish with English summary.

As a contribution to the study of ozone distribution in the antarctic stratosphere, a number of total ozone and ultraviolet observations were carried out in summer 86/87 between 60-63 S. A brief review of the current knowledge of the 'ozone hole' phenomenon is presented. In conclusion, no anomaly is found regarding a decrease of total ozone, and the spring destruction phenomenon did not occur in the

latitudes observed. The high ultraviolet-radiation values are attributed to the composition of the lower stratosphere layers and not to a decrease in the effectiveness of the ozone cover filter. (Auth. mod.)

I-36368

Gil Ojeda, M., Cacho Gomez, J., Sainz de Aja, M.J., **UV-B radiation increment in Antarctica as a consequence of stratospheric ozone depletion** [Incremento de la radiación UV-B en la Antártida como consecuencia de la reducción del ozono estratosférico], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.137-148, 10 refs., In Spanish with English summary.

An ultraviolet radiation increase in the lower levels of the atmosphere may be the immediate result of ozone depletion. A simple model between mesopause and surface has been used to evaluate the increase rate under different situations. The study has been extended to antarctic latitudes and dates in which the phenomenon known as "ozone hole" is maximum. In the spring of 1985 and 1986 the ozone depletion corresponded to 60% of the normal values. (Auth. mod.)

I-36369

Cisneros, J.M., **Relationship between aircraft contamination and the destruction of atmospheric ozone** [Relaciones entre la contaminación de los aviones y la destrucción del ozono atmosférico], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.149-160, 8 refs., In Spanish with English summary.

Many studies were carried out in the early 70's, when the first commercial flights reached the stratosphere at supersonic speeds, in an effort to estimate the effects of those flights on ozone contents of the atmosphere. Some of these studies were not restricted to the stratospheric level flights, but also considered the rising pollution in the rest of the conventional flight levels as a result of an increase in the density of military and commercial flight networks. The conclusions of these studies are discussed in this paper in the light of recent theories trying to explain ozone neutralization in the antarctic region. (Auth.)

I-36393

Steele, L.P., **Global distribution of methane in the troposphere,** *Journal of atmospheric chemistry,* June 1987 5(2), p.125-171, Refs. p.169-171.

Methane has been measured in air samples collected at approximately weekly intervals at 23 globally distributed sites in the NOAA/GMCC cooperative flask sampling network. Sites range in latitude from 90S to 76N. The latitudinal distribution of methane and the seasonal variation of this distribution in the marine boundary layer has been defined in great detail, including a remarkable uniformity in background levels of methane in the Southern Hemisphere. The observation of a complete seasonal cycle of methane at the South Pole is reported. Globally averaged background concentrations in the marine boundary layer have been calculated for the 2 year-period May 1983-Apr. 1985 inclusive, from which an average increase of 12.8 ppb per year is found, or 0.78% per year when referenced to the globally averaged concentration (1625 ppb) at the mid-point of this period. Evidence is presented that there has been a slowing down in the methane growth rate. (Auth. mod.)

I-36411

Eckman, R.S., Haigh, J.D., Pyle, J.A., **Important uncertainty in coupled chlorine-carbon dioxide studies of atmospheric ozone modification,** *Nature,* Oct. 15, 1987 329(6140), p.616-619, 14 refs.

Calculations are presented using a two-dimensional atmospheric model of the effect on stratospheric ozone of increases in the atmospheric abundances of CO2 and various chlorine-containing compounds. Such calculations have been carried out previously but changes in the kinetic data used in the model have led to very significant differences in the calculated ozone modification. In particular, the lower stratosphere, a difficult region to model, now plays an even more crucial role in the vertically integrated ozone depletion. It is believed that uncertainties in the thermal response of the lower stratosphere represent a significant limitation in our ability to predict future states of the middle atmosphere. The model extends from the ground to 95 km and from pole to pole. The figures presented show some of the antarctic and sub-antarctic data used.

I-36412

Tuncel, G., Zoller, W.H., **Atmospheric iridium at the South Pole as a measure of the meteoritic component,** *Nature,* Oct. 22, 1987 329(6141), p.703-705, 33 refs.

The measurement of iridium (Ir) in atmospheric samples is important because it given information on the short-term flux of extraterrestrial material without interference from fragmentation products from large bodies. Such information cannot be obtained from sediment samples, because sediment samples integrate over millions of years and include contributions of large bodies impacted in that time period. Presented here is a determination of average particle-borne Ir concentration in the South Pole atmosphere. The average value of 7.3 x 10 sup -17 g/cu m suggests that the concentration of extraterrestrial material in the South Pole atmosphere is not large enough to explain the enrichments of anomalously enriched elements; however, meteoritic material contributes significantly to the observed concentrations of Co, Fe and Mn. The accretion rate for background extraterrestrial material is estimated at 11,000 tons annually. (Auth.)

I-36418

Trenberth, K.E., **Role of eddies in maintaining the westerlies in the Southern Hemisphere winter,** *Journal of the atmospheric sciences,* June 1, 1987 44(11), p.1498-1508, 26 refs.

The distribution of the mean westerly wind over the globe is described for June, July and August, the southern winter, using analyses from the European Centre for Medium Range Weather Forecasts (ECMWF) from 1979 to 1982. The tropospheric momentum budget is analyzed from both the traditional Eulerian and the transformed Eulerian perspectives. Thus an assessment is made of the Eliassen-Palm flux divergence and the diabatically driven residual mean circulation. The vertical mean budget is also analyzed to allow deductions about the mean surface torque by the atmosphere on the earth and the gross surface stress. Analyses of parameters measured are shown in the various figures which extend through the sub-antarctic regions to the Antarctic. (Auth. mod.)

I-36423

Melgarejo, J.W., **Analytical model of the boundary layer above sloping terrain with an application to observations in Antarctica,** *SMHI reports meteorology and climatology,* May 1986 No.51, 98p., Refs. p.72-75.

Analytical solutions of a set of equations that couples the Ekman and the Prandtl boundary layer equations were obtained; closure on the subgrid scale was via the eddy exchange (K) approach, where K was made to depend on both the internal stability and height raised to an arbitrary power. The boundary layer height was also made to depend on the internal stability. An interesting and novel result is

the finding that there are 3 different regimes of solutions, presented in graphical form, from which the appreciable influence of terrain slope on the cross-isobaric inflow angle, the momentum- and heat-transfer is clearly discernible. Also in a preliminary test of the results of this investigation with observations, it is found that the theoretical values of the cross-isobaric angle are in good agreement with the observed values in Antarctica and therefore encouraging for further research. (Auth. mod.)

I-36427
Koptev, A.P., Kazakova, N.N., Gil'chenko, N.G., **Subsystem for meteorological, actinometric and aerological observations in the polar regions** [Podsistema meteorologicheskikh, aktinometricheskikh, aerologicheskikh nabludeniĭ v poliarnykh raĭonakh], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.7-25, In Russian. 24 refs.

Subsystems designed for observations in the polar regions, methods of measurements, and instrumentation are described. Guidelines toward greater data reliability, and further improvements on measuring systems and equipment, are provided. Illustrations of the systems are included.

I-36428
Gil'chenko, N.G., **Method for measuring air temperature and evaluation of its reliability** [Metod izmereniia temperatury vozdukha i otsenka ego pogreshnosti], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.26-34, In Russian. 15 refs.

Studies on the reliability of a method used in measuring air temperature at antarctic stations are discussed. The limit of allowable error in this method is determined to be 1.0C. It is shown that the method under discussion meets the need of providing the correct meteorological information indispensable for operational meteorological forecasts.

I-36429
Koptev, A.P., Zachek, A.S., **Results of methodology investigations by evaluation of subsystems for meteorological and actinometric observations** [Nekotorye rezul'taty metodicheskikh issledovaniĭ po otsenke podsistemy meteorologicheskikh i aktinometricheskikh nabliudeniĭ], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.34-46, In Russian. 5 refs.

On the basis of statistical analysis of synchronized comparative measurements of air temperature and humidity, wind speed and direction and the computation of radiation balance, an assessment is made of the uniformity and isotropy of the meteorological and actinometric elements measured. Results confirm the reliability of the automatic systems evaluated.

I-36430
Koptev, A.P., Gil'chenko, N.G., **Characteristics of a semiautomatic method for actinometric measurements** [Osobennosti poluavtomaticheskogo metoda aktinometricheskikh izmereniĭ], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.47-51, In Russian. 7 refs.

The following principal features of a method for the computation of radiation balance are described: measurement techniques, parameters measured, and equipment; auxiliary systems; accuracy; and the influencing physical factors, such as air temperature, humidity, wind speed and magnetic field intensity. In conclusion, analysis of literature reveals a 2-20% inaccuracy from instruments employed in the method discussed.

I-36431
Alekseeva, R.P., Gil'chenko, N.G., **Duration of sunshine measured by actinograph** [Opyt izmereniia prodolzhitel'nosti solnechnogo siianiia s pomoshch'iu aktinografa], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.61-65, In Russian. 8 refs.

A method is proposed which should allow to fully automate the measuring process of sunshine duration and to obtain the measurements with a single threshold of the instrument's reaction. Presented are also monthly and yearly corrections for the values of sunshine duration obtained by heliographic and actinographic methods.

I-36432
Gil'chenko, N.G., Liachnev, V.V., **Instrument control method in computing radiation balance based on the law of probability** [Sposob kontrolia raboty ustanovok dlia izmereniia sostavliaiushchikh radiatsionnogo balansa, osnovannyĭ na ispol'zovanii veroiatnostnykh kriteriev], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.66-73, In Russian. 16 refs.

A method is described for controlling the instruments for radiation balance computation based on the following criteria: probability of undetected error and probability of false error. Coefficients of allowable corrections for different values, or allowable error limits of model and equipment used, are determined. The method proposed permits to decrease significantly the length and labor of the operation; it brings about the control with very small probability of undetected error, and establishes a basis for marginal probability criteria of the measuring devices.

I-36433
Gil'chenko, N.G., **Error evaluation for a scale transformer of measurements of radiation balance components** [Otsenka pogreshnosti masshtabnogo izmeritel'nogo preobrazovatelia pri izmerenii sostavliaiushchikh radiatsionnogo balansa], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.74-79, In Russian. 7 refs.

The limit of allowable error introduced by the scale transformer in radiation balance measurements is determined as 0.6%, the root-mean-square deviation not exceeding 0.4%.

I-36434
Alekseeva, R.P., Dubovtseva, V.V., **Actinometric data processing and prospects of its development on ES computers** [Obrabotka aktinometricheskoĭ informatsii i perspektivy ee razvitiia na EVM ES], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.79-91, In Russian. 5 refs.

A step-by-step procedure of actinometric data processing in polar regions is discussed, including automatic and semiautomatic methods of data gathering, a critical computerized analysis of the data and an objective evaluation of the functioning of the station's operator and of the quality of the actinometric information obtained.

I-36435
Balabanov, V.S., **Algorithm for processing and control of hourly data in meteorological surveys** [Algoritm obrabotki i kontrolia ezhechasnykh dannykh meteorologicheskikh nabliudeniĭ], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.92-98, In Russian. 2 refs.

A flowchart is presented of a program for the processing and control of meteorological information, with detailed analysis of the following blocks: preliminary preparation of data processed, introduction into the computer, control of syntax and logic, control of accidental and systematic errors, and printing of errors.

I-36436
Balabanov, V.S., Rechnov, A.A., **Flowchart for processing and control of meteorological information from Soviet antarctic and *North Pole* drift stations** [Blok-skhema obrabotki i kontrolia meteorologicheskoĭ informatsii sovetskikh antarkticheskikh i dreĭfuiushchikh stantsiĭ *Severnyĭ polius*], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.99-106, In Russian. 9 refs.

A flowchart is presented for automated processing and control of meteorological data, which deals with methods used in polar regions. The chart is based on the correlation of meteorological data obtained at Soviet antarctic research stations, and the *North Pole* drift stations, and classifies accidental and systematic errors testing different data control methods.

I-36437
Rechnov, A.A., Alekseeva, R.P., Balabanov, V.S., **Developing automatic subsystems for control of regular meteorological and actinometric data from Soviet antarctic stations** [Osnovnye printsipy postroeniia avtomatizirovannykh podsistem kontrolia rezhimnoĭ meteorologicheskoĭ i aktinometricheskoĭ informatsii sovetskikh antarkticheskikh stantsiĭ], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.107-119, In Russian. 22 refs.

The principles guiding the construction of automatic subsystems for control and qualitative evaluation of meteorological and actinometric data in Antarctica are discussed in detail. Fundamental methodological research questions, and pertinent literature, are reviewed.

I-36438
Cherniak, A.V., Rechnov, A.A., **Method for evaluating variation limits in radiation balance components through empirical frequency distribution** [Metod otsenki znacheniĭ doveritel'nykh granits variatsii sostavliaiushchikh radiatsionnogo balansa po empiricheskim chastotnym raspredeleniiam], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.120-135, In Russian. 5 refs.

A method is proposed for the calculation of numerical criteria used in an algorithm for control in radiation balance computations. Results obtained with the method proposed are compared, and found similar, to those from other, well known, theoretical methods.

I-36439
Rechnov, A.A., **Automatic control structure of radiation balance components at Soviet stations** [Struktura avtomatizirovannogo kontrolia sostavliaiushchikh radiatsionnogo balansa sovetskikh nauchnykh stantsiĭ v Antarktide], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.136-152, In Russian. 9 refs.

A flowchart is presented for automatic checking of measurements of radiation balance components, which deals with identification of accidental and systematic errors and the automatic correction of the data. The criteria used in the compilation of the algorithm are based on radiation data obtained at Soviet antarctic stations.

I-36440
Rechnov, A.A., **Procedure for checking radiation-balance-component totals at Soviet antarctic stations** [Protsedura kontrolia summ sostavliaiushchikh radiatsionnogo balansa sovetskikh antarkticheskikh stantsiĭ], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.153-165, In Russian. 8 refs.

A combination of algorithms for automatic checking of radiation-balance-component totals is proposed, based on critical analysis of continuous records from various Soviet stations. The algorithms provide for individual checking for each antarctic station, thus achieving a high degree of effectiveness. The algorithm shown and described detects accidental errors in values of radiation-balance-component hourly totals.

I-36441
Gil'chenko, N.G., Samushkin, V.A., Fridberg, E.I., **Principles for complex automation of verification of actinometric measuring devices** [Osnovnye printsipy kompleksnoĭ avtomatizatsii poverki sredstv izmereniĭ dlia polucheniia aktinometricheskoĭ informatsii], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.166-176, In Russian. 16 refs.

Presented are the basic principles of complex automatic verification of actinometric measuring devices. The stages of automation are described; the basic needs of the measuring devices and auxiliary systems are determined; recommendations are made as to which devices to employ during verification; and the limits of allowable calibration errors of the primary transformers are specified.

I-36442
Safronov, V.A., **Information automation system in multiple marine expeditions** [Avtomatizirovannaia informatsionnaia sistema v kompleksnykh morskikh ekspeditsiiakh], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.403, p.177-185, In Russian. 5 refs.

Investigated are problems related to the installation, on ship, of an automated system for collecting, processing, storing and transmitting hydrometeorological information. A technical plot is presented for data handling in marine operations with modern equipment linked to computers.

I-36495
Paegle, J.N., **First International Conference on Southern Hemisphere Meteorology 31 July-6 August 1983, São José dos Campos, Brazil,** *American Meteorological Society. Bulletin,* Jan. 1984 65(1), p.48-53.

The Conference brought together 250 scientists from 19 countries and produced 96 presented papers in eleven scientific sessions. These sessions focused on: general circulation; blocking and persistent anomalies; stationary waves; rainfall fluctuation and associated circulation; precipitation analyses; numerical prediction and objective analysis; synoptic-scale circulations; circulations in South America and the tropical Pacific; and tropical cyclones and African circulations. In several of the sessions high latitude and antarctic influences were especially noted.

I-36496

Beatty, N.B., ed, Workshop on First Detection of Carbon Dioxide Effects, Harpers Ferry, WV, June 8-10, 1981, **Carbon dioxide effects research and assessment program,** Washington, D.C., U.S. Dept. of Energy, Office of Energy Research, 1981, 546p., DE82-016 633, DOE/CONF-8106214, For selected papers see 42-838 through 42-843 or F-36498, F-36499 and I-36497.

Scientists are agreed that the global mean carbon dioxide concentration in the atmosphere is increasing at the rate of about 1.0 to 1.5 parts per million per year. In order to develop a program on the first detection of the effects of increased CO2 concentration, the best available scientists were engaged to point the way. To accomplish this, a Workshop sponsored by the U.S. Department of Energy was held at the Cliffside Motor Inn, Harpers Ferry, West Virginia, June 8-10, 1981. Four areas were examined: the atmosphere, the polar regions, the oceans, and the biosphere. Papers were commissioned for presentation in each of these areas, and other relevant papers were also included. In addition, four panels were set up, one in each of these areas, to discuss the papers and other relevant material. All the papers and the panel reports are included in this volume. Three are pertinent to Antarctica.

I-36497

Fletcher, J.O., Boville, B.W., **Report on the Polar Panel,** Workshop on First Detection of Carbon Dioxide Effects, Harpers Ferry, WV, June 8-10, 1981. Proceedings. Carbon dioxide effects research and assessment program. Edited by N.B. Beatty, Washington, D.C., U.S. Dept. of Energy, Office of Energy Research, 1981, p.197-205. DOE/CONF-8106214; DE82-016 633.

Discussions of detection of CO2 effects in the polar regions are presented in 3 phases: monitoring of CO2 concentrations—in particular the seasonal variation comparisons between the Arctic and the Antarctic, radiative effects of changing CO2, and early indicators of climatic variation. Descriptions of each phase, with a list of recommendations for effective control measures, are offered.

I-36501

Trenberth, K.E., **Second International Conference on Southern Hemisphere Meteorology 1-5 December 1986, Wellington, New Zealand,** *American Meteorological Society. Bulletin,* Sep. 1987 68(9), p.1124-1132.

Papers presented at the 2nd International Conference on Southern Hemisphere Meteorology are summarized. One session dealt with antarctic and Southern Hemisphere meteorology. In this session N. Budd gave a review of the interactions of atmosphere, ocean and ice at high southern latitudes; I. Simmonds and M. Dix described an experiment with a 5-wave global PE model in which the total sea ice was removed in a July simulation; S. Stuchi and J. Paegle examined meridional flows over the high plateau of Antarctica; and a number of speakers reported results of new observational studies.

I-36502

Nomura, A., **Lidar observations of the mesospheric sodium layer at Syowa Station, Antarctica,** *Geophysical research letters,* July 1987 14(7), p.700-703, 16 refs.

The mesospheric sodium layer was measured for 42 nights during the period from Apr. to Oct., 1985, at Showa Station by using a dye laser radar (lidar) tuned to the D2 line of sodium. In contrast to the results obtained at mid-latitudes in the Northern Hemisphere, the seasonal variation in abundance showed no significant winter maximum. Further, there was no apparent seasonal variation in the vertical distribution of sodium density. However, oscillatory variations in abundance with a period of about 40 days was observed. The nocturnal variations in the sodium density profile have a wavelike structure with a vertical wavelength of 10 to 16 km and a period of 3 to 8 hours, which suggests strongly that gravity waves are propagating upward through the sodium layer. The sodium lidar measurements during auroral activity give evidence that the layer is disturbed in association with the auroral breakup event. (Auth.)

I-36503

Webster, C.R., **NO2/NO partitioning as a test of stratospheric ClO concentrations over Antarctica,** *Geophysical research letters,* July 1987 14(7), p.704-706, 12 refs.

Physical conditions in the 10-20 km region of the antarctic stratosphere make the $[NO_2]/[NO]$ ratio particularly sensitive to high chlorine levels in the form of ClO. According to simple known photochemical relationships between NO2, NO, ClO, and O3, high ClO levels of 1 ppbv over Antarctica must be accompanied by large values of the $[NO_2]/[NO]$ ratio. At high ClO abundances, the $[NO_2]/[NO]$ ratio is approximately proportional to the ClO concentration. It is proposed that *in-situ* measurements of the $[NO_2]/[NO]$ ratio could be used to test the high chlorine hypothesis. (Auth.)

I-36509

Garcia, R.B., Solomon, S., **Possible relationship between interannual variability in antarctic ozone and the quasi-biennial oscillation,** *Geophysical research letters,* Aug. 1987 14(8), p.848-851, 26 refs.

Extra-tropical temperatures, geopotential heights, and total ozone abundances are known to vary with the tropical Quasi-Biennial Oscillation (QBO), although the details of the causal mechanisms linking the two regions are still a subject of debate. It is shown that total ozone amounts observed in Antarctica during 1979-1986 exhibit year-to-year fluctuations that may be due to the influence of the QBO, with relatively low (high) values occurring during the westerly (easterly) phase. This suggests that the QBO should be taken into account when evaluating the amplitude and continuation of the long-term trend in antarctic total ozone. In particular, if the tropical QBO is in its westerly phase during Oct., 1987, an increase in total ozone at that time may be inconsistent with the continuation of the secular decrease observed since the 1970's. (Auth.)

I-36510

Sabutis, J.L., Stanford, J.L., Bowman, K.P., **Evidence for 35-50 day low frequency oscillations in total ozone mapping spectrometer data,** *Geophysical research letters,* Sep. 1987 14(9), p.945-947, 14 refs.

A large number of investigations is currently focused on low frequency oscillations (LFO) of the tropical atmosphere, with periods of one to two months. Recently, the existence of LFO in the stratosphere has been postulated by global circulation model results and also by observations based on satellite microwave and infrared data. However, the observational results are not well captured by the model calculations. The present work utilizes an independent set of satellite data, four years of data from the Total Ozone Mapping Spectrometer

(TOMS), between latitudes 65N and 65S, as a check on the previous observational analyses. Evidence is found for the existence of 35-50 day oscillations in the TOMS data over the Southeast Pacific and South Indian oceans, corroborating the earlier observational report. (Auth.)

I-36522

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic weather,** Christchurch, n.d., 6 leaves.

A brief overview is given to acquaint newcomers with a part of the natural environment they will have to cope with. Temperatures and winds are discussed and a table shows monthly averages at Scott Base and McMurdo. Weather phenomena are linked to wind directions, katabatic wind effects are pointed out, and some of the unique polar atmospheric features, such as whiteouts and long sunlight periods, are noted.

I-36541

Nogués-Paegle, J., Stucki, S.C., **Impact of winds over the antarctic plateau on Southern Hemisphere circulations,** Conference on Mountain Meteorology, 4th, Seattle, WA, Aug. 25-28, 1987. [Proceedings], Boston, MA, American Meteorological Society, 1987, p.238-240, 3 refs.

After a review of ice cover and solar radiation interaction, and the resulting formation of katabatic winds, a study of the wintertime characteristics of atmospheric flows over Antarctica, based on 6 yr. gridded data obtained from the European Center for Medium Range Weather Forecasts, is reported. Results are compared with those obtained from a linearized shallow water equation model. Differences between these solutions and winter averaged flows suggest a classification method to isolate persistent circulations over mid and high latitudes of the Southern Hemisphere.

I-36545

Jones, R.R., **Ozone depletion and cancer risk,** *Lancet,* Aug. 22, 1987 2(8556), p.443-447, 34 refs.

The sharp decline in ozone concentrations over Antarctica, and the vast implications for human health that any extension of this depletion to more densely populated areas of the globe will carry, are discussed. From this point of view, the ozone chemistry, absorption of ultraviolet radiation by ozone in the stratosphere and the biological consequences to living organisms when this fails, are reviewed, the etiology of skin cancer being linked to ultraviolet exposure. It is pointed out that only an 85% reduction in CFC output would stabilize atmospheric ozone concentration at the present level. So far the EEC countries have committed themselves only to a freeze, to be followed by a 20% reduction after 5 years.

I-36571

Farrell, M.P., ed, **Master index for the carbon dioxide research State-of-the Art Report series,** *U.S. Department of Energy. Report,* Mar. 1987 DOE/ER-3016, 253p., Refs. p.77-94.

The following is included in the report: executive summaries of 4 state of the art reports and 2 supporting documents dealing with atmospheric carbon dioxide and the global carbon cycle, projecting and detecting the climatic effects of increasing carbon dioxide; the effects on vegetation, characterization of information requirements for studies of CO2 effects, and glaciers, ice sheets, and sea level effect of CO2-induced climatic change, respectively; a glossary of terms; tables; a glossary of acronyms; indexes of common and scientific names; a citation index; and a subject index.

I-36573

Kikuchi, T., Ageta, Y., **Glaciological research program in east Queen Maud Land, East Antarctica, Part 6, Advance Camp, 1985,** *Japanese Antarctic Research Expedition. JARE data reports,* Sep. 1987 No.129, 104p., 4 refs.

The inland traverse party of JARE-26 reached the Advance Camp (AC), established as part of the East Queen Maud Land Glaciological Project, on Feb. 7, 1985, where glaciological and meteorological observations were carried out until the end of the month. The party left AC on Mar. 1 for wintering over at Mizuho and Showa stations, returning to AC on Oct. 14, 1985. Ice cores were drilled to a depth of 200 m. The report provides the following glaciological and meteorological data obtained at AC: the surface and the upper atmosphere meteorological data, the net radiative heat flux, and the net accumulation of snow.

I-36578

Yoshihira, T., Shudo, Y., Kajihara, R., Sasaki, M., **Meteorological observations at Syowa Station in 1982 by the 23rd Japanese Antarctic Research Expedition,** *Antarctic record,* July 1987 31(2), p.131-154, In Japanese with English summary. 8 refs.

This paper describes the results of meteorological observations from Feb. 1, 1982 to Jan. 31, 1983, at Showa Station. The observations and the statistics of surface and aerological data were automatically processed until Sep. 1, 1982 after which the upper air observations were carried out manually. Remarkable characteristics are as follows: the ten-day mean temperature of late Aug. and early Sep. was lower than the normal values over 5 C. A minimum temperature -45.3 C, recorded on Sep. 4, was the lowest value since the observation had begun at Showa Station. Forty-two blizzards occurred of several days duration. The snow depth measured on Oct. 30 was 105.6 cm, which was deeper than the normal values throughout the year. (Auth.)

I-36585

Stolarski, R.S., **Antarctic ozone hole,** *Scientific American,* Jan. 1988 258(1), p.30-36, 3 refs. (p.112).

A review is given of the recent findings of ozone depletion over the South Pole region and the role of chlorofluorocarbons (CFCs) as a cause of the depletion. Chemical processes are described to show how the CFCs react on ozone to attenuate the shield over Antarctica. Some of the effects of the depletion on people and environments are discussed. A possible role is projected of polar stratospheric clouds as transformers of chlorine reservoirs into active chlorine to react unfavorably with the ozone as the sun begins to shine again following the dark antarctic winter. A dynamical mechanism as a factor in the process is also a possibility.

I-36590

Kawaguchi, S., ed, Watanabe, O., ed, NIPR Symposium on Polar Meteorology and Glaciology, **Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology. No.1,** Tokyo, National Institute of Polar Research, 1987, 161p., For individual papers see 42-1183 through 42-1187 or B-36605, F-36603, F-36604, F-36606, H-36598, I-36591 through I-36597 and I-36599 through I-36602.

The 17 papers and 17 abstracts in this volume provide a representative sample of the topical range covered by participants in the 9th NIPR Symposium held Dec. 11-12, 1986. Ozone depletion and atmospheric chemistry are addressed in many of the papers; results of glaciological work appear here in mostly abstract form. The full symposium program list and author index close the volume.

I-36591
Krueger, A.J., Stolarski, R.S., Schoeberl, M.R., **Characteristics of the antarctic ozone hole derived from Nimbus 7 TOMS data,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.1-9, 15 refs.

The general structure of Southern Hemisphere total ozone is a polar minimum surrounded by a circumpolar maximum. Over much of the year the gradients are quite small except for local midlatitude storms. However, during the spring months the difference between the minimum and the maximum grows with time. The boundary of the polar minimum is generally very sharp with a gradient of 10 Dobson units/100 km not uncommon, thus justifying the term "ozone hole" to describe this feature. A station in the boundary region will undergo very large changes in ozone as the position of the hole drifts and fluctuates. Finally, the ozone hole is destroyed as the polar vortex breaks down in Nov. The data from TOMS show that dynamics are critical in the formation of the ozone hole. Total ozone in the antarctic region is highly correlated with air temperature in the lower stratosphere. (Auth. mod.)

I-36592
Kondoh, K., Iwasaka, Y., Suzuki, T., Kaneto, S., **Ozonesonde measurements at Syowa Station (69 deg 00 min S, 39 deg 35 min E): preliminary result,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.10-17, 15 refs.

Ozonesonde measurements at Showa Station from 1971 to 1984 show that ozone depletion was most striking at altitudes between 10 to 25 km for the spring of the last 5 years. This ozone loss region corresponds to the region where a noticeable temperature drop was observed, also only in the spring, from 1981 to 1985. The comparison of the change in temperature field of the antarctic stratosphere with that in the other regions suggests the possibility that the changes with a long time scale of about 10 years in the global-scale temperature field (and possibly with the dynamical systems in the stratosphere) are associated with the antarctic ozone depletion in the last 10 years or so. (Auth.)

I-36593
Sekiguchi, Y., **Antarctic ozone change correlated to the stratospheric temperature field and the solar activity,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.18-23, 9 refs.

Total ozone data obtained by ground-based measurements using a Dobson spectrophotometer at Showa Station are analyzed together with stratospheric temperature data at the same site. The period of analysis is 21 years from 1966 to 1986, covering almost two solar cycles. The time series of monthly averages of the two quantities for Oct., Nov. and Dec. is compared with the time series of the relative sunspot numbers. A moderately high correlation is found between the relative sunspot number, and the total ozone and the stratospheric temperature at Showa for the 21-year period. A peak negative correlation with respect to the present-day 11-year sunspot cycle is found at a lag of 3 years of ozone (or temperature) relative to the sunspots. This result is discussed in connection with the results obtained by other observers in 1962 and 1965. (Auth.)

I-36594
Iwasaka, Y., Shi, G.-Y., **Comment on aerosol effect on antarctic ozone,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.24-30, 21 refs.

The structure of the aerosol layer disturbed by cold air was suggested from lidar measurements at Showa Station. A particle layer containing sublayers of spherical or nonspherical aerosols is frequently observed in the antarctic spring. It is a point one should not ignore when discussing aerosol effects on antarctic ozone depletion through radiative processes and heterogeneous chemical reactions. (Auth.)

I-36595
Kawahira, K., Hirooka, T., **Interannual variations of zonal mean temperature in the Southern Hemisphere stratosphere: with reference to the antarctic ozone depletion,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.31-38, 11 refs.

Interannual variations of the zonal mean temperature in the antarctic lower stratosphere are analyzed for the period 1980 to 1985 by using NMC data. It is found that the antarctic polar stratosphere tends to cool not only in spring but in all seasons. Analysis of the meridional gradient of the zonal mean temperature shows that the period of temperature decrease toward the pole in winter has become longer and longer in recent years in accord with the antarctic ozone depletion. From this evidence, the interrelation between the temperature decline and the ozone depletion is considered as follows: slight cooling induced by the effect of increasing CO2 can form polar stratospheric clouds, and more clouds are formed by radiative cooling. Enhanced cooling in the polar region can induce ozone depletion due to less poleward transport of ozone by planetary waves, which becomes less active in the polar region due to trapping by long-persistent, strong westerlies. (Auth.)

I-36596
Yamazaki, K., **Transport characteristics in the troposphere and lower stratosphere of the Southern Hemisphere,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.39-53, 19 refs.

Trajectory analyses of air parcels for the Southern Hemisphere spring are performed with observed data during the period from Sep. to Dec. 1982. It is found that the diffusivity at 60S and poleward in the lower stratosphere is low during early spring. Diffusion in Dec. is nearly homogeneous and turbulent in the lower stratosphere. Net advective motion is estimated. In Sep. at 50-100 mb, the net advective motion is upward in the polar region and downward at 50-60S. This meridional cell is quite similar to one proposed earlier in both shape and magnitude. A sudden increase of ozone was observed at Showa Station on Oct. 28, 1982. It is inferred from the backward trajectory analysis that this sudden ozone increase was primarily caused by a strong downward motion. (Auth.)

I-36597
Tanaka, H., **How gravity waves affect formation of low temperature region in antarctic lower stratosphere,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.54-58, 5 refs.

A mechanism is proposed for the formation of an "ozone hole" over Antarctica. Gravity waves emitted from the circum-continental

mountain (or cliff) belt may be partly saturated in the lower stratosphere and suppress planetary wave activity there. This process results in shielding a poleward heat transport associated with planetary waves. A long-term trend of gravity wave activity and prevailing wind system for the past several years should be detected in the polar region. (Auth.)

I-36599

Hirota, M., Murayama, H., Makino, Y., Muramatsu, H., **Gas-chromatographic measurements of atmospheric methane at Syowa Station in 1983, and between Tokyo and Syowa Station late in 1984,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.69-73, 6 refs.

Atmospheric methane was measured by a gas-chromatographic method. Air samples were collected at Showa Station in 1983, and on board between Tokyo and Showa Station late in 1984. Mixing ratios at Showa Station showed some seasonal variation and were in good agreement with those at Mawson Station. Mixing ratio decreased gradually from 30 to 5N, and steeply between 5N and the equator. In the Southern Hemisphere, mixing ratios were almost constant between the equator and 66S. The mean value was 1.577 ppm and the standard deviation was 0.008 ppm. (Auth.)

I-36600

Yamato, M., **Evidence for the presence of submicron sulfuric acid particles in summer antarctic atmosphere: preliminary results,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.74-81, 11 refs.

Direct samplings of aerosol particles in the summer antarctic atmosphere were carried out at Showa Station and Asuka Camp (71.5S, 24.1E) in 1985 and 1986. To determine the molecular state of submicron sulfate particles, a vapor-deposited calcium thin film method was used. It was proved directly that sulfuric acid particles predominated at Showa Station and Asuka Camp in the summer antarctic atmosphere. (Auth.)

I-36601

Yamato, M., Iwasaka, Y., Ono, A., Yoshida, M., **On the sulfate particles in the submicron size range collected at Mizuho Station and in east Queen Maud Land, Antarctica: preliminary results,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.82-90, 13 refs.

Aerosol particles were sampled at Mizuho Station and in east Queen Maud Land (73.1-74.8S, 39.8-34.8E) from Apr. to Nov. 1984. The vapor-deposited BaCl2 thin film method was used to identify sulfate-containing particles. Morphological identification of the individual particles was also made in order to determine their actual molecular state. It was confirmed from the morphology of particles that particles containing sulfuric acid were predominant in east Queen Maud Land in summer, whereas ammonium sulfate particles were predominant in winter at Mizuho Station. These results are similar to the results at Showa Station. Sulfuric acid particles existed as a minor component at Mizuho Station even in winter when photochemical production of sulfuric acid particles was not dominant. (Auth.)

I-36602

Endoh, T., **Trial operation of a simple automatic weather station at Asuka Camp, Antarctica,** NIPR Symposium on Polar Meteorology and Glaciology, 9th, Vol.1 edited by T. Matsuda, S. Kawaguchi, and O. Watanabe, Tokyo, National Institute of Polar Research, 1987, p.103-112, 1 ref.

A tentative unmanned observation program was carried out at Asuka Camp in 1985 by means of a data logger equipped with a thermometer and an anemometer. The data logger, run by lithium batteries, was buried in the surface snow without any heater. Although the sensors were covered by heavily drifting snow during the later period of observation, the desired recordings were performed successfully. Analyses of the obtained data provided information on diurnal variations of air temperature, periods and behavior of disturbances, monthly mean air temperature and depth of snow drift at Asuka Camp in 1985. (Auth.)

I-36608

Hofmann, D.J., Rosen, J.M., Harder, J.W., Rolf, S.R., **Observations of the decay of the El Chichón stratospheric aerosol cloud in Antarctica,** *Geophysical research letters,* June 1987 14(6), p.614-617, 14 refs.

Balloonborne measurements of stratospheric aerosol in the late Oct.-early Nov. period in 1983, 1984 and 1985 indicate that the sulfuric acid aerosol which formed in the stratosphere following the eruption of El Chichón in 1982, and which was subsequently transported to the polar regions, decayed over Antarctica with an exponential decay time of about one year, in reasonable agreement with extensive measurements at Laramie during this period. These results suggest that the increased aerosol burden over Antarctica, which occurred as a result of the El Chichón eruption, cannot be directly involved in the precipitous decline of stratospheric ozone in Antarctica since 1982, although indirect effects cannot be ruled out.

I-36609

Goldman, A., Murcray, F.J., Murcray, F.H., Murcray, D.G., **Quantification of HCl from high resolution infrared solar spectra obtained at the South Pole in December 1986,** *Geophysical research letters,* June 1987 14(6), p.622-623, 6 refs.

Ground-based infrared solar spectra at 0.02/cm resolution obtained at the Amundsen-Scott South Pole station in Dec. 1986 have been analyzed for the atmospheric content of HCl. Nonlinear least-squares spectral fitting applied to the spectra yields a total HCl column amount of 6.4 quadrillion molec/sq cm, most being stratospheric. This amount is larger than that extrapolated from earlier results on the latitudinal distribution of atmospheric HCl. (Auth.)

I-36611

Connor, B.J., **Ozone over McMurdo Station, Antarctica, austral spring 1986: altitude profiles for the middle and upper stratosphere,** *Journal of geophysical research,* Nov. 20, 1987 92(D11), p.13,221-13,230, 39 refs.

Various ozone altitude profiles were measured from McMurdo Station by ground-based millimeter-wave spectrometry, on 34 days between Sep. 12 and Oct. 29, 1986. The mixing ratio peaked at altitudes ranging from 28 to 34 km, with peak values between 5 and 9 parts per million by volume (ppmv). The ozone mixing ratio at 25 km decreased by 15% during the period. No significant decrease was observed at higher altitudes; the upper limit on any secular trend at 33 or 40 km is about 8%. Considerable variability was observed at all altitudes, on time scales of 1 to a few days. In the most dramatic case, ozone in one layer nearly doubled between Sep. 20 and 23. This was accompanied by a significant warming and an increase in N2O at the same altitudes. Results are compared to concurrent balloon-

sonde ozone measurements, to a model prediction, and to satellite measurements of total ozone. The observation that ozone depletion was confined to the lower stratosphere is consistent with theories invoking heterogeneous chemistry associated with polar stratospheric clouds. It may be consistent with theories which predict upwelling is confined to the lower stratosphere. The data do not support theories predicting depletion in the upper stratosphere, but the seasonal coverage of the measurements was too limited to be definitive. (Auth.)

I-36612

Berresheim, H., **Biogenic sulfur from the subantarctic and antarctic oceans,** *Journal of geophysical research,* Nov. 20, 1987 92(D11), p.13,245-13,262, Refs. p.259-262.

Measurements of the atmospheric distributions of dimethylsulfide (DMS), sulfur dioxide (SO2), methanesulfonate (MSA), non-sea-salt sulfate, and methylmercaptan (MeSH) were made over the Drake Passage and the coastal and inshore waters west of the Antarctic Peninsula during the 1986 austral fall season. DMS concentrations were also measured in the surface ocean, and vertical profiles were obtained at several locations in the inshore water areas. Detailed results of these measurements are given. (Auth. mod.)

I-36613

Murcray, F.J., **Infrared measurements of several nitrogen species above the South Pole in December 1980 and November-December 1986,** *Journal of geophysical research,* Nov. 20, 1987 92(D11), p.13,373-13,376, 30 refs.

Ground-based high-resolution infrared solar absorption spectra recorded from the Amundsen-Scott South Pole Station have been analyzed to determine total vertical column amounts of N species. Results of the measurements are given and significant aspects are discussed. (Auth. mod.)

I-36624

Kotliakov, V.M., **Evolution of thermal conditions in Central Antarctica for the last 150,000 years determined from oxygen isotope studies of a core from Vostok Station** [Evoliutsiia termicheskikh uslovii Tsentral'noĭ Antarktidy za 150 tysiach let po izotopno-kislorodnym issledovaniiam kerna so stantsii Vostok], *Materialy gliatsiologicheskikh issledovaniĭ,* Jan. 1987 Vol.59, p.30-37, In Russian with English summary. 43 refs.

The ice core from Vostok Station, from the surface to a depth of 2081 m, agrees with isotope horizons 1-6 of oceanic sediments, with the age up to 150-160 thousand years. The data obtained for the central areas of East Antarctica testify to the conditions of glacial maximum during the isotope stages 2, 4, 5(d), 6; interstadials 3, 5(a-c) and interglacial 5(e) and variations of the mean annual temperature, respectively by -6, -8, -2, -5 and 3-4 deg, as compared to the present-day temperature. Comparison of these data with numerous data on oceanic sediments suggests the transition from the interglacial to the Last Ice Age in polar latitudes about 115,000 years ago, while in the temperate and low latitudes it took place only 75,000 years ago. (Auth.)

I-36625

Verbitskiĭ, M.IA., Monin, A.S., Chalikov, D.V., **Modelling of Quaternary glaciations** [Modelirovanie chetvertichnykh oledeneniĭ], *Materialy gliatsiologicheskikh issledovaniĭ,* Jan. 1987 Vol.59, p.38-42, In Russian with English summary. 10 refs.

A thermohydrodynamic model of the system Glaciers-Ocean-Atmosphere-Astenosphere made it possible to analyze the causes of ice ages. Tests of the sensitivity of this model to the changes of initial conditions have shown that the Earth's climate is intransitive under the present-day conditions of insolation and position of the continents. Climatic system is established to have 5 steady states, associated with different spreading of the ice cover. Mechanisms governing the transition of one climate into another are analyzed. It is concluded that location, form, dimensions and relief of the continents are decisive agents of the global climatic changes. (Auth.)

I-36643

Fukunishi, H., **MAP observations at Syowa Station in 1985,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.229-243, 24 refs.

Coordinated observations of the antarctic middle atmosphere were conducted by JARE-23 and JARE-26 at Showa Station during 1982-1985 in cooperation with the Middle Atmosphere Program (MAP). An outline of the campaign is given. Observations were carried out by a combination of remote-sensing techniques from the ground and spacecraft and *in-situ* measurements with balloons and sounding rockets. The major ground-based remote-sensing facilities were a Dobson spectrophotometer for ozone measurement, a ruby lidar for stratospheric aerosol measurement and a dye lidar for sodium layer measurement, a VHF doppler radar for measuring motions of ionized and neutral atmospheres and a multi-beam riometer for monitoring particle precipitation. The meteorological rockets launched at 2-hour intervals succeeded in detecting internal gravity waves at the 20-70 km altitude range. (Auth. mod.)

I-36644

Hirasawa, T., **Japanese MAP results in Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.244-255, Refs. p.235-255.

As a major program of Japanese MAP, which was conducted in 1982-1985, the coordinated observations for the antarctic middle atmosphere were carried out at and in the vicinity of Showa Station. The observations were for the following 6 items: dynamics of the middle atmosphere; atmospheric constituents; stratospheric and tropospheric aerosols; wind, wave and tide in the stratosphere; atmospheric pollution, and particle precipitation and interaction of the middle atmosphere with the lower ionosphere. The results of some of these observations are reviewed in this report. (Auth.)

I-36645

Gernandt, H., **Preliminary result of the ozone observation at GDR-Research Base (70.77S, 11.85E) from May to Dec. 1985,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.256-271, 3 refs.

At 70.77S, 11.85E, regular balloon-borne ozone soundings were started in 1985. These soundings have been performed using an electrochemical ozone sonde on the basis of the Brewer principle. A comparison was made with ozone soundings at middle northern latitudes. During polar spring, the period of extreme ozone depletion, a double peak structure was typical at 71S. The analysis of the height variations of two peaks suggests that they are due to different physical mechanisms at high southern and middle northern latitudes. (Auth.)

I-36646

Gernandt, H., Leiterer, U., Schulz, K.-H., **Some results of ground based aerosol optical depth measurements in Antarctica in summer 1984-1985,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.272-277, 14 refs.

Experimental results of aerosol optical thickness in East Antarctica are presented. The observations were carried out by a GDR-team at 3 Soviet Antarctic stations during the polar summer of 1984-85. A nearly uniform optical thickness was observed at the coastal stations Mirny and Molodezhnaya, as well as at the continental station Vostok. (Auth.)

I-36652
International Conference on Southern Hemisphere Meteorology, 1st, San Jose dos Campos, Brazil, July 31-Aug. 6, 1983, **Proceedings,** Boston, American Meteorological Society, 1983, 380p., Refs. passim. For selected papers see I-36653 through I-36658.

A number of papers prepared for this conference attended by scientists of 11 different countries, are presented in this volume using data obtained during the FGGE year. Six are pertinent to Antarctica and deal with interannual variability of storm tracks and eddy activity, traveling planetary waves and wave, mean-flow interactions, comparison of quasi-stationary waves of both hemispheres, analysis of meteorological data from automatic weather stations, antarctic depressions near the Drake Passage, and interannual variations in sea ice-cyclone interactions, respectively.

I-36653
Trenberth, K.E., **Interannual variability of storm tracks and eddy activity in the Southern Hemisphere,** International Conference on Southern Hemisphere Meteorology, 1st. Proceedings, Boston, American Meteorological Society, 1983, p.1-6, Spanish version p.7-11. 21 refs.

The zonal mean of the Global Weather Experiment (GWE) statistics have been compared with the means and standard deviations over all years; a sampling of these results is presented here. However, for both summer and winter, years that show a marked contrast to that of the GWE are chosen in order to compare the dynamical consistency of the changes in the relationships between the mean flow and eddy statistics. The GWE summer of 1978-79 is contrasted with 1976-77 and, for winter, 1979 is contrasted with 1980. For summer as a whole, neither the mean fields nor the eddy statistics were extremely unusual. For winter, both the mean flow and the eddy statistics during the GWE were quite anomalous in many respects. (Auth.)

I-36654
Mechoso, C.R., Hartmann, D.L., Yamazaki, K., **Observations of traveling planetary waves and of wave, mean-flow interactions in the Southern Hemisphere,** International Conference on Southern Hemisphere Meteorology, 1st. Proceedings, Boston, American Meteorological Society, 1983, p.29-32, 8 refs.

A persistently eastward propagating zonal wavenumber 2 accounts for a large fraction of the wave energy in the Southern Hemisphere stratosphere. The nature of transient waves in the Southern Hemisphere and their interaction with the mean flow is the subject of this paper. The data used in this study are for the winter period of May 14-Sep. 13, 1979. The power, phase and coherency for zonal wavenumber 1 moving eastward a band of periods centered on 15 days is shown. The power has two maxima at 300 mb, one at 50S and one at 70S. Similar results have been obtained for the eastward moving component of wavenumber 2. When the westward moving components of zonal wavenumbers 1 and 2 are considered, quite different results are obtained. There is only one coherence-squared maximum in the troposphere and the coherence between the troposphere and the stratosphere is substantial. (Auth.)

I-36655
Loon, H. van, **Comparison of the quasi-stationary waves on the Northern and Southern hemispheres,** International Conference on Southern Hemisphere Meteorology, 1st. Proceedings, Boston, American Meteorological Society, 1983, p.77-84, Spanish version p.85-88. 16 refs.

The differences in the atmosphere over the two hemispheres are discussed, and among such differences is the vertical structure of the quasistationary waves. The part these waves play in the transfer of sensible heat toward the pole is the topic of this paper, with the conclusion that by far the bigger amount of sensible heat in the Southern Hemisphere is carried by moving waves, unlike conditions over the Northern Hemisphere during its winter.

I-36656
Renard, R.J., Thompson, W.J., Hervey, S.P., **Analysis of pressure, temperature and wind data from remote site automatic weather stations near McMurdo, Antarctica,** International Conference on Southern Hemisphere Meteorology, 1st. Proceedings, Boston, American Meteorological Society, 1983, p.234-237, 5 refs.

A remote site automatic weather station (AWS) network has been established on the antarctic continent and the nearby ice shelf areas. The network has grown from one AWS at several testsite locations in the period 1975-1977 to 13 currently. A map shows the general areas of antarctic deployment. Data from stations on the Antarctic Peninsula will be used for barrier wind studies and data from sites between Dumont d'Urville and Dome Charlie for katabatic wind research. AWS observations from the western Ross Ice Shelf area have been used to identify mesoscale circulations and give operational support to the McMurdo Weather Center. Data from all units will add to the climate base; in particular, the units at Byrd and Siple will contribute to long-term climate monitoring. (Auth.)

I-36657
Lyons, S.W., **Characteristics of intense antarctic depressions near the Drake Passage.,** International Conference on Southern Hemisphere Meterology, 1st. Proceedings., Boston, American Meteorological Society, 1983, p.238-240, 4 refs.

Composites of polar depression characteristics from NOAA-7 photographs have resulted in a model to aid in subjective classification of polar depression strength. Polar depression composites have identified 5 primary features associated with depression intensity. Listed in order of importance, and discussed, they are: direction of depression movement, cloud and frontal deformation with time, extent of cloud vortex curvature, speed of depression, and cloud characteristics. A classic example of an antarctic depression formation and movement through the Drake Passage is shown. (Auth. mod.)

I-36658
Carleton, A.M., **Interannual variations in Southern Hemisphere sea ice-cyclone interactions,** International Conference on Southern Hemisphere Meterology, 1st. Proceedings., Boston, American Meteorological Society, 1983, p.241-244, 11 refs.

The author examines the link between interannual variations in the latitudinal extent of southern ocean sea ice and the synoptic-scale (cyclonic) atmospheric circulation of the Southern Hemisphere during the five winter-growth periods (June through Sep.) of 1973-77. Strong variations characterize both parameters for this period. The study also verifies the strongly regional dependence of ice-cyclone interactions in the circumpolar trough. These appear strongest in the Ross Sea, but are still of importance in East Antarctica. Cyclonic activity is secondary to ice distribution and its interannual variability in the Weddell Sea. (Auth.)

I-36659
International Conference on Southern Hemisphere Meteorology, 2nd, Wellington, New Zealand, Dec. 1986, **Proceedings,** Boston, American Meteorological Society, 1986, 482p., For individual papers see 42-1388 through 42-1396 or F-36671, I-36660 through I-36670 and I-36672 through I-36678.

The Conference, which was held in Dec. 1986 in Wellington, New Zealand, received responses from scientists in 17 different countries. They submitted more than 150 papers of which 120, in extended abstract form, are included in this volume along with short abstracts of 12 others. Weather analysis and forecasting is one highlighted topic; a new emphasis on Tropical Oceans Global Atmosphere (TOGA) is also strongly featured with sessions on El Nino-Southern Oscillation and tropical meteorology. Twenty of the papers have significant application to Antarctica. These discuss, among others, such topics as sea ice, simulation of antarctic climate, katabatic and upper level winds, automatic weather stations, the meteorology of besetment, laser cloud studies, and atmospheric ozone.

I-36660

Budd, W.F., **Southern Hemisphere circulation of atmosphere ocean and sea ice,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.101-106, 16 refs.

A major feature of the Southern Hemisphere atmospheric circulation is the strong concentration of centers of low pressure systems in the region from 40 to 70S around the edge of the antarctic continent and sea ice zone. Results of a 5 year study of the mean climatology of cyclogenesis in the Southern Hemisphere were reported earlier. This study has since been extended to each month of a 10 year period. This extended data set now provides a basis for describing the mean climatology of the annual cycle of cyclogenesis, cyclone tracks and cyclolysis as well as the interannual variability. (Auth.)

I-36661

Simmonds, I., Dix, M., **Circulation changes induced by the removal of antarctic sea ice in a July general circulation model,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.107-110, 8 refs.

While a number of general circulation model studies have been performed with high latitude forcing by prescribed sea ice and sea surface temperature anomalies in the Northern Hemisphere (NH) few have been carried out for the Southern Hemisphere (SH). There are several reasons for believing that the responses there could be rather different from those produced in the NH (SH sea ice is more zonally-symmetric, the circulation regime is very different, etc.). A large sea ice anomaly was imposed on a model of Sep. climate in the SH. In this paper experiments are reported which extend the work using an improved model. An assessment is made of the remote and local response of a model atmosphere to large- and regional scale sea ice forcing in the SH. (Auth.)

I-36662

Schlesinger, M.E., **Atmospheric general circulation model simulations of the modern antarctic climate,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.111-112, 8 refs.

In this paper the modern summer and winter climates in and around Antarctica simulated by nine contemporary global atmospheric general circulation models are compared with the corresponding observed climates. The simulated and observed climates are presented in terms of their surface air temperatures, sea-level pressures, precipitation rates, and cyclogenesis and cyclone tracks. (Auth.)

I-36663

Stucki, S.C., Paegle, J.N., **Effect of Antarctica on upper level flows during the 1979 winter,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.113-116, 8 refs.

This study is based on data from the 92 days of June, July and Aug. 1979, during the Global Weather Experiment for which the most comprehensive data sets ever were collected. Gridded analyses developed at the Geophysical Fluid Dynamics Laboratory (GFDL) are used. Differences between the 1979 winter and the climatological mean may be due to either a better data base or to an anomalous year. The most significant changes were lower heights over Antarctica, a deep circumpolar pressure belt, and larger values of the high latitude zonal wind maxima. This strong circulation should facilitate detection of signals at the high latitudes emphasized in the investigation. (Auth.)

I-36664

James, I.N., **Katabatic drainage flows over Antarctica and the polar vortex,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.117-118, 4 refs.

The spectacular and persistent katabatic winds over the antarctic continent have been studied by several authors and the strength and orientation of the surface wind relative to the orography of the ice sheet are now reasonably well understood. The persistent outflow of surface air from the continent must, in the long time mean, be balanced by inflow aloft. In turn, this general convergence in the middle troposphere will generate cyclonic vorticity over the continent. Three questions arise and are addressed: is the vorticity generated by this process comparable to that resulting via thermal wind balance from surface temperature contrasts between ice and ocean? What vertical structure and, in particular, what depth will the return circulation have? Can a relationship between the ice sheet topography and the upper level vorticity be outlined? (Auth.)

I-36665

Van Meurs, B., Allison, I., **Application of automatic weather station data to the study of katabatic flow in East Antarctica,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.119-122, 8 refs.

Parameters measured by the automatic weather stations deployed by ANARE include air pressure, wind speed and direction 4 m above the surface, air temperatures at 1, 2 and 4 m above the surface, and snow temperature. One AWS operated continuously from Jan. 1982 to May 1984 at a site about 130 km inland from Mawson Station, at an elevation of 1850 m on the relatively steep edge of the ice sheet where katabatic flow is dominant. Two years of data from this station were analyzed to show the annual and diurnal variation of wind and temperature at this site and gain some insight into the inversion strength and the strength of the katabatic flow. The analysis carried out was based on the assumption of zero potential temperature gradient along the ice slope and the validity of this is discussed. The results are presented on a seasonal basis determined from additional data from a solar cell on the station which indicated that the year could be conveniently divided into 4 seasons on the basis of the duration and intensity of solar radiation. (Auth. mod.)

I-36666

Savage, M.L., Stearns, C.R., **Weather and climate in the vicinity of Ross Island, Antarctica,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.123-126, 2 refs.

Remarkably persistent southerly surface winds occur over the northwestern Ross Ice Shelf. On the climatic scale, the persistent drainage of cold air from the antarctic interior to lower latitudes may generate sufficient baroclinity at the interface between the Ross Ice Shelf and the Transantarctic Mountains to produce mountain-parallel flow at the surface. This is the barrier wind explanation introduced in 1970. The analyses presented here support this theory, and indicate that even in the case of cyclones impinging upon the region, the influence of topography is sufficient to distort the low level circulations into prematurely initiating and sustaining strong southerly winds. (Auth.)

I-36667

Wilson, J.C., **Meteorological factors associated with the besetment of the M.V. *Nella Dan* off the antarctic coast, October 1985,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.127-129, 3 refs.

After discussing generally methods of navigation and ship operations in ice and the several problems hindering or halting these endeavors, the meteorological events leading to the besetment of MV *Nella Dan* are reviewed. The interactions of the long wave near *Nella Dan,* wave action in the sea, sea water and air temperature, and time spans in which these factors operated are discussed.

I-36668

Streten, N.A., Nairn, J.R., **Regional climate of two antarctic oases,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.130-133, 12 refs.

The Vestfold and Bunger Hills experience climates, in general typical of the east antarctic coastal region but differ from the surrounding ice coasts in receiving a positive net radiation budget, slightly higher mean temperatures in summer, generally light winds (which however, vary substantially dependent on site and proximity to the ice cap), and enhanced summer convective cloud. A well marked diurnal summer sea breeze is also a feature of the coastal parts of the Vestfold Hills. (Auth.)

I-36669

Wada, M., Iwasaka, Y., **Cloud studies at Syowa Station in East Antarctica by means of laser-radar,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.134-137, 12 refs.

The studies seek to identify characteristic features of antarctic clouds and to understand the relationships between ice crystals and supercooled water droplets in the clouds. The lidar measuring system is described and light components used in the measurements are defined. Temperatures at the top and bottom of cloud echoes are used to calculate integrated backscatter.

I-36670

Chubachi, S., Kajiwara, R., **Annual change of atmospheric ozone including the polar night season at Syowa Station, Antarctica,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.138-140, 2 refs.

The change of atmospheric ozone over Antarctica is interesting with respect to the decreasing tendency of total ozone over Antarctica called "OZONE HOLE" phenomenon. This phenomenon was first reported as an extraordinarily low value of total ozone from Sep. to Oct. in 1982 at Showa Station. In this paper, the corrected value of total ozone and the vertical ozone distribution are described. Because of the extended periods without sunlight over Antarctica, it is important to compare the accuracy of moonlight and sunlight observations. (Auth.)

I-36672

Kidson, J.W., **Indices of the Southern Hemisphere zonal wind,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.188-191, 8 refs.

In a recent study, an examination was made of an irregular cycle which appeared during the winter months of 1979 with an average period of around 27 days. Opposing variations in the 500 hPa zonal wind were found in bands centered on 48.75 and 67.5 S and an index based on their difference was used to depict the changes in circulation patterns. A preliminary study based on Australian hemispheric analyses for 1968-1983 suggested that the zonal index variations were larger and more regular than usual during the winter of 1979. This presentation describes a more detailed analysis of the Australian data at both 500 hPa and mean sea level over this extended period and derives two principal indices which characterize variations in the zonal circulation. The behavior of these indices is examined on a seasonal basis and their relation to the hemispheric flow patterns explored. (Auth.)

I-36673

Yoden, S., Shiotani, M., Hirota, I., **Multiple planetary flow regimes in the Southern Hemisphere,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.196-199, 2 refs.

It is proposed that the low-frequency variation of the zonal mean geostrophic wind in the Southern Hemisphere troposphere can be understood as an almost intransitive one with multiple planetary flow regimes. An observational study is performed with the aid of daily data (1980-1983) analyzed at the National Meteorological Center. Data for the study extend to about 70S. (Auth. mod.)

I-36674

Yamazaki, K., Tokioka, T., Kitoh, A., **Interannual variation and teleconnections in the Southern Hemisphere simulated by a 12-year run of the MRI GCM-I,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.204-207, 9 refs.

Teleconnectivity and EOF analysis are used to explore the dominant spatial pattern of the long-term variations in the Southern Hemisphere model atmosphere. Generally, the teleconnectivity in the Southern Hemisphere is weaker than that in the Northern Hemisphere in winter and summer. The teleconnectivity in summer is stronger than that in winter. There exists an out-of-phase relation between the middle latitude and the south polar region in the 300 mb geopotential height and the sea level pressure. This north-south seesaw simulated by the model is clearly seen in summer, and is similar to the observed one. (Auth.)

I-36675

James, I.N., **Midlatitude response of the Southern Hemisphere circulation to forcing by Antarctica,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.252-254, 4 refs.

In this study, it is shown that steady tropical and subtropical disturbances can only penetrate the Southern Hemisphere winter circulation to around 40S. It is suggested that the steady waves poleward of these latitudes (including the New Zealand block) are a direct

result of the zonal asymmetry introduced by the off-polar bulk of Antarctica. (Auth.)

I-36676

Hale, R.A., Renard, R.J., **Statistical visibility forecasting at McMurdo/Williams Field, Antarctica using local/regional observations,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.256-259, 8 refs.

Discriminate functions are developed to predict the probability of visibility being less than 3, 2 or 0.5 miles for each of the 3-, 6- and 12-h forecasts at McMurdo and Williams Field, for the cold (Aug., Sep., Oct., Mar.) and warm (Nov., Dec., Jan., Feb.) seasons. Preliminary results from the discriminate approach, as well as persistence and conditional climatology, are summarized. (Auth.)

I-36677

Mechoso, C.R., Farrara, J.D., **Climatology and interannual variability of wave, mean-flow interaction during winter and spring in the Southern Hemisphere,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.304-307, 14 refs.

Studies of the spring circulation in the Southern Hemisphere became particularly timely after the recent discovery of a pronounced trend towards ozone depletion particularly over Antarctica during this season. The spatially and temporally localized character of this feature in ozone depletion suggests that dynamical processes play a major role in its development. Sections 2 and 3 of this paper describe the winter and spring circulations and their interannual variability, respectively. The circulation during winter and spring of 1982 is analyzed in Section 4. (Auth.)

I-36678

Carleton, A.M., **Antarctic sea ice—atmosphere signal of the southern oscillation,** International Conference on Southern Hemisphere Meteorology, 2nd. Proceedings, Boston, American Meteorological Society, 1986, p.431-434, 17 refs.

Interactions between the extreme phases of the Southern Oscillation (SO) and antarctic sea ice parameters (e.g. concentration) at the regional scale have heretofore not been investigated. This paper presents the results of such an analysis for summer ice in the Weddell Sea/South Atlantic for SO events in the period 1929-62. They indicate the presence of an SO signal in the sea ice that arises from antecedent (springtime) anomalies in the sign and magnitude of the meridional component of the surface wind over the southwest Atlantic. (Auth.)

I-36682

Bowman, K.P., **Global trends in total ozone,** *Science,* Jan. 1, 1988 239(4835), p.48-50, 21 refs.

Satellite ozone data from the Total Ozone Mapping Spectrometer from 1979 through 1986 show that recent decreases of total ozone have not been confined to the antarctic spring season (the antarctic ozone hole), but are global in extent. The losses are about twice the estimated uncertainty in the satellite data. The decreases are largest in middle and high latitudes and occur in all seasons of the year. The decreases for this 8-year period are comparable in magnitude to the increases observed during the 1960s. Southern Hemisphere values from 1986 are generally greater than those from 1985. (Auth.)

I-36717

Makide, Y., **Atmospheric halocarbons in the antarctic area,** *Polar news,* Feb. 1986 No.42, p.10-17, In Japanese.

The atmospheric concentrations of anthropogenic halocarbons such as CCl2F2, CCl3F and CH3CCl3 have been measured in Antarctica as well as in the mid-latitude Northern Hemisphere (Hokkaido). The concentrations of these compounds are steadily increasing in both hemispheres. The total concentration of chlorine atoms in the atmosphere due to the halocarbons will be more than twenty times as large as the natural background concentrations in future with current emission rates of the halocarbons, and a large depletion of the stratospheric ozone is predicted.

I-36723

Crowley, T.J., Mengel, J.G., Short, D.A., **Gondwanaland's seasonal cycle,** *Nature,* Oct. 29, 1987 329(6142), p.803-807, 65 refs.

A two-dimensional energy balance climate model has been used to simulate the seasonal temperature cycle on a supercontinent-sized land mass. Experiments with idealized and realistic geography indicate that the land-sea configuration in high latitudes exerts a strong influence on the magnitude of summer warming. These simulations provide significant insight into the evolution of climate during the Palaeozoic, and raise questions about the presumed pre-eminent role of carbon dioxide in explaining long-term climate change. (Auth.)

I-36739

Godoy, J.M., Reis, V.R.G., Recio, J.C., **Levels of radioactive precipitation on King George Island** [Niveis de precipitação radioativa na Ilha Rei George], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* July 1987 No.11, p.11-14, In Portuguese. 2 refs.

Results of analyses for radioactive fallout in 13 samples collected during various Brazilian antarctic operations in 1986 are reviewed. Samples include 2 of algae, 3 of snow, one of iceberg, one of moss, 4 of seawater, and 2 of sediments. Detectable levels of Cs-137, Sr-90 and Pb-210 were only found in the moss sample. Charts showing Sr-90 accumulations in both hemispheres in 1983, and annual accumulation on Deception I., are presented.

I-36742

Singh, N.P., Trivedi, K.I., Rathore, L.S., Rizvi, S.R.H., **Meteorological observations: 1983-'84 antarctic summer,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.21-47.

Extensive meteorological observations of surface and upper air parameters were taken from ship platform during the voyage from Goa to Antarctica and back, and also at Schirmacher Hills station and at Dakshin Gangotri. The important meteorological events, such as storms and blizzards, encountered during the expedition and the antarctic weather are discussed. Variations in observations taken at different locations and observational arrangements made by other countries are also referred to. Specific objectives were to make detailed studies of synoptic weather; to monitor changes in the troposphere and stratosphere; to take synoptic weather observations; to provide weather support for expedition activities and helicopter operations; and to study sea ice conditions and learn sea ice data sources. (Auth. mod.)

I-36743

Rizvi, S.R.H., **Meteorological studies at Dakshin Gangotri (Antarctica) March 1984 to February 1985,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.49-73.

The Third Indian Scientific Expedition to Antarctica established a permanent meteorological station at Dakshin Gangotri to monitor both surface and upper air parameters. This report contains results of these observations, continuously taken at this station for one year. The variations in temperature, wind velocity and atmospheric pressure, and their influence on different weather systems are discussed.

The low pressure systems moving over and around Antarctica carry warm and moist air, whereas ridges draw in cold air. Significant fluctuations in temperature, pressure and wind speed have been noticed in moving weather systems. (Auth.)

I-36760

Hanjura, A.K., **Study of the ionised and non-ionised atmosphere,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.251-254.

During the Third Indian Scientific Expedition to Antarctica, a permanent station with all facilities for conducting laboratory experiments was established and D-region ionization and the ground level pressure variations were studied. These studies were made as a continuation of experiments conducted during the earlier expeditions. The results of riometer experiments and a microbarograph experiment are discussed in this paper. (Auth.)

I-36779

Farmer, C.B., **Stratospheric trace gases in the spring 1986 antarctic atmosphere,** *Nature,* Sep. 10, 1987 329(6135), p.126-130, 15 refs.

The atmospheric absorption features of over 500 infrared solar spectra recorded at McMurdo Station, have been analyzed to determine the vertical column abundances of trace gases crucial to the understanding of the ozone hole phenomenon. Results are presented in tables and graphs. Between Sep. 15-22 and Oct. 15-22 the chlorine species were found to show large increases, suggesting that during Sep. a major fraction of the total stratospheric chlorine burden is either frozen out or is present in some molecular form other than HCl or ClONO2. The chemical partitioning bewteen HCl and ClONO2 is also highly abnormal during Sep. While this is not proof of a cause and effect relationship between halogenated source gases and the springtime ozone depletion, it is entirely consistent with such hypotheses.

I-36803

Stordal, F., Garcia, R.R., **Sensitivity studies and a simple ozone perturbation experiment with a truncated two-dimensional model of the stratosphere,** *Journal of geophysical research,* Oct. 20, 1987 92(D10), p.11,909-11,918, 38 refs.

Earlier work is extended by including tracers with photochemical production in the stratosphere (O3 and NOy). Latitudinal variations in the photochemical sources and sinks are included, improving slightly the calculated global mean profiles for the long-lived tracers and improving substantially the latitudinal behavior of ozone. Sensitivity tests of the dynamical parameters in the model are performed, showing that the response of the model to changes in vertical residual meridional winds and horizontal diffusion coefficients is similar to that of a full two-dimensional model. A simple ozone perturbation experiment shows the model's ability to reproduce large-scale latitudinal variations in total ozone column depletions as well as ozone changes in the chemically controlled upper stratosphere. Limitations of the model as a tool for perturbation studies are discussed. The ozone perturbation experiment centers on Antarctica. (Auth. mod.)

I-36811

Simmonds, I., Dix, M., Mitchell, J.F.B., Hills, T.S., **Comment on 'Sea-ice and the antarctic winter circulation: a numerical experiment' by J.F.B. Mitchell and T.S. Hills (October 1986, 112, 953-969),** *Royal Meteorological Society, London. Quarterly journal,* Oct. 1987 113(478), p.1396-1403, 8 refs. Includes reply by Mitchell and Hills. For the article being commented on see 41-1474 (I-34782).

In the original article an experiment was conducted by Mitchell and Hills to test the sensitivity of a general circulation model to changes in antarctic sea ice extent. The results were in good agreement with those of Simmonds except in the sea level pressure parameter. In the present comment and reply the sea level pressure disagreement continues and is discussed at some length.

I-36849

Matthews, W.A., Keys, G.J., Johnston, P.V., **Transport and photochemical effects seen in stratospheric NO2 amounts,** *Journal of atmospheric and terrestrial physics,* Nov.-Dec. 1986 48(11-12), p.1093-1097, 14 refs.

Column contents amounts of NO2 were measured from the sites at 45S, 53S and 78S using long path differential absorption spectroscopy. In spring, the two mid-latitude sites exhibit essentially the same smooth winter to summer transition. While this trend is also present in the antarctic data, large amplitude oscillations with a period of approximately 9 days are superimposed on this trend. These oscillations are explained in terms of transport of mid-stratospheric air from more poleward or more equatorial latitudes. The observed night-time decay of NO2 is shown to agree with a simple N2O5 chemical conversion scheme. (Auth. mod.)

I-36850

Koshel'kov, IU.P., **Mean geopotential fields for the lower thermosphere of the Southern Hemisphere,** *Journal of atmospheric and terrestrial physics,* Nov.-Dec. 1986 48(11-12), p.1121-1143, 10 refs.

Satellite radiance data are used to compile monthly mean contour maps in polar projection for the Northern and Southern hemispheres for the 0.005 mb and 0.001 mb constant pressure surfaces. Aspects of the seasonal and spatial distribution of the geopotential height fields are discussed. Zonal geostrophic wind speeds are calculated from the zonal mean heights. (Auth.)

I-36851

Stolarski, R.S., Jackman, C.H., Kaye, J.A., **Diagnostic analysis of two-dimensional monthly average ozone balance with Chapman chemistry,** *Journal of atmospheric and terrestrial physics,* Nov.-Dec. 1986 48(11-12), p.1145-1151, 16 refs.

Chapman chemistry has been used in a two-dimensional model to simulate ozone balance phenomenology. The similarity between regions of ozone production and loss calculated using Chapman chemistry and those computed using LIMS and SAMS data with a photochemical equilibrium model indicate that such simplified chemistry is useful in studying gross features in stratospheric ozone balance. Net ozone production or loss rates are brought about by departures from the photochemical equilibrium condition. Gross features of ozone loss/production (L/P) inferred for the real atmosphere from data are also simulated using only eddy diffusion. Figures with ozone L/P and distribution between 90S and 90N (pressure 0.1-1,000 mb) are presented. (Auth. mod.)

I-36852

Portniagin, IU.I., Kaĭdalov, O.V., **Tides in the 80-100 km height region,** *Journal of atmospheric and terrestrial physics,* Nov.-Dec. 1986 48(11-12), p.1159-1173, 32 refs.

From long-term continuous wind velocity measurements, by the meteor radar method for the 80-100 km height region, the seasonal and latitudinal variations of atmospheric tides, as well as the spatial and temporal scales of tidal variability, have been determined on Heiss I., at Obninsk and at Molodezhnaya Station. Atmospheric variations with a period of about half-a-day are investigated on the basis of a numerical model. A dependence between the mean wind structure and the semi-diurnal oscillation in the lower thermosphere is established. The influence of stratospheric warmings on semi-diurnal oscillations is also discussed. Numerical experiments show that the

mean wind variations cannot explain the observed seasonal variations of a semi-diurnal tide. (Auth.)

I-36853

Memmesheimer, M., Gaertner, V., Blum, P.W., **Seasonal transitions and possible polar mesospheric cloud regions calculated by a zonally averaged model of the middle atmosphere,** *Journal of atmospheric and terrestrial physics,* Nov.-Dec. 1986 48(11-12), p.1185-1196, 34 refs.

A global, zonally averaged dynamical model of the middle atmosphere is used to calculate the seasonal variations of winds and temperature from 10 to 110 km. The main purpose of the study is to search for the existence of regions where noctilucent or polar mesospheric clouds (NLC/PMC) may be formed. For this purpose the difference between the actual temperature and the frost point is calculated based on a fixed water vapor mixing ratio. Possible cloud existence regions (PCR) are defined by the condition that the actual temperature is below the frost point inside the PCR. It is found that this is the case for the summer polar mesopause during May-Aug. (in the Northern Hemisphere) and Nov.-Feb. (in the Southern Hemisphere). The PCR extends from the pole to approximately 60 deg latitude at a height of about 85 km. In addition, in the lower stratosphere during winter the temperature also falls below the frost point, approximately at an altitude where stratospheric clouds are observed. (Auth. mod.)

I-36854

Jakobs, H.J., Bischof, M., Ebel, A., Speth, P., **Simulation of gravity wave effects under solstice conditions using a 3-D circulation model of the middle atmosphere,** *Journal of atmospheric and terrestrial physics,* Nov.-Dec. 1986 48(11-12), p.1203-1223, 39 refs.

Vertically propagating gravity waves can transport momentum and energy from the troposphere up to the mesosphere and thus modify the circulation of the middle atmosphere. The effects of regional gravity wave sources, together with temporal changes of gravity wave activity, are studied under solstice conditions in a 3-D circulation model using a simplified parameterization scheme for the gravity momentum deposition. The reversal is reproduced of the mean zonal wind with height and very low temperatures at the summer mesopause region. Using a stochastic forcing by taking the gravity wave parameters at random, characteristic oscillations are found with periods in the planetary scale range (2, 4 and 5 days) and in the tidal range (1 day, 16 h and 12 h). (Auth.)

I-36856

De Mora, S.J., Patterson, J.E., Bibby, D.M., **Atmospheric mercury concentrations inside Scott Base,** *New Zealand antarctic record,* 1987 8(1), p.5-8, 12 refs.

A survey of mercury levels inside Scott Base was conducted as part of a study of atmospheric mercury in the Ross Dependency. Baseline concentrations of atmospheric mercury are known to be low in remote locations. Concentrations of the order of 1-2 ng/cu m are typically observed for clean air and even in urban environments tend to be well below 100 ng/cu m. Mercury in air samples at sites near Scott base was analyzed using a mercury detector within the base. Thus, the air survey within the base was a necessary precaution to check for local contamination. At the same time, sampling and analytical procedures could be tested, in particular ensuring suitable blanks and detection limits were attainable. Results of the collection and analysis of the air samples are discussed. (Auth.)

I-36863

Leiterer, U., Schulz, K.-H., **Experimental data on aerosol optical thickness in Antarctica in summer 1984/85,** *Zeitschrift für Meteorologie,* 1987 37(6), p.315-321, With German summary. 18 refs.

The main results on the spectral atmospheric aerosol optical thickness derived from observations made in East Antarctica are presented. A nearly constant optical thickness of about 0.03 during the summer is remarkable at the coastal stations and at the inland station Vostok at the height of 3500 m. Some problems associated with the method and the accuracy of measurements made with the spectrophotometer BAS-M are also discussed. (Auth.)

I-36875

Shell, E.R., **Solo flights into the ozone hole reveal its causes,** *Smithsonian,* Feb. 1988 18(11), p.142-155.

The 8-week Airborne Antarctic Ozone Experiment, carried out by an international team of scientists and technicians with the object of finding out why the stratosphere above Antarctica loses nearly half of its ozone every year, is described. Two theories, one meteorological and the other chemical, are discussed. The dynamics of the chemicals of most concern, the CFCs, and the controversy over whether ozone is being destroyed by chlorine in the stratosphere or not, are reviewed. The details of the project, consisting of 7 experiments conducted from 2 airplanes, one cruising over the antarctic continent at 40,000 feet taking measurements, the other flying into the hole itself, are given. The results show a clear connection between high chlorine levels and ozone depletion; the situation is likened to a low-temperature flame burning over an area the size of a continent, and an appeal is made to reduce the fuel for this flame.

I-36880

Zabel, F., **Possible anthropogenic causes for the antarctic ozone hole** [Das antarktische Ozonloch—anthropogene Ursachen?], *Chemie in unserer Zeit,* Oct. 1987 21(5), p.141-150, In German. 27 refs.

The problem of the atmospheric ozone hole over Antarctica is reviewed and man's part in its creation is examined. Since the area of ozone depletion over Antarctica has been steadily increasing for the last ten years, the question is posed whether this might be the first indicator with which to forecast global proportions for the condition. Ozone measurements made at the South Pole are introduced and the prevailing hypotheses explaining the phenomenon are discussed.

I-36882

Fraser, P.J., Hyson, P., **Methane, carbon monoxide and methylchloroform in the Southern Hemisphere,** *Journal of atmospheric chemistry,* Mar. 1986 4(1), p.3-42, Refs. p.29-33.

New observational data on CH4, CO and CH3CCl3 in the Southern Hemisphere are reported. The observational sites include several antarctic stations. The data are analyzed for long term trends and seasonal cycles. CH3CCl3 data are used to scale the OH fields incorporated in a two dimensional model, which in turn, is used to constrain the magnitude of a global CH4 source function. The possible causes of observed seasonality of CH3CCl3, CH4 and CO are identified, and several other aspects of observed CH4 variability are discussed. Possible future research directions are also given. (Auth. mod.)

I-36883

Pearman, G.I., Hyson, P., **Global transport and inter-reservoir exchange of carbon dioxide with particular reference to stable isotopic distribution,** *Journal of atmospheric chemistry,* Mar. 1986 4(1), p.81-124, Refs. p.117-122.

A two-dimensional model of global atmospheric transport is used to relate estimated air-to-surface exchanges of carbon dioxide (CO2) to spatial and temporal variations of atmospheric CO2 concentrations and isotopic composition. The atmospheric model coupled with models of the biosphere and mixed layer of the ocean describes the gross features of the global carbon cycle. In particular this paper con-

siders the change in isotopic composition due to interreservoir exchanges and thus the potential application and measurement requirements of new isotopic observational programs. Tabulated data, obtained at selected observatories around the world, including the Falkland Is. and Palmer and Amundsen-Scott stations, are presented. A comparison is made between the model-generated CO2 concentration variation and those observed on secular, interannual and seasonal time scales and spatially through the depth of the troposphere and meridionally from pole-to-pole. (Auth. mod.)

I-36884

Thompson, M.L., Enting, I.G., Pearman, G.I., Hyson, P., **Interannual variation of atmospheric CO2 concentration,** *Journal of atmospheric chemistry,* Mar. 1986 4(1), p.125-155, Refs. p.151-154.

A method is described for the analysis of the interannual variability of background atmospheric carbon dioxide concentration. The analysis is carried out on the data from 6 observatories including that at the Amundsen-Scott Station, for which records of >8 years were available. A global-scale interannual variation of CO2 concentration in the troposphere with a characteristic time-scale of 2-3 years has been confirmed throughout the period of the records. The interannual variations of CO2 increase are found to be correlated with those observed in data for Pacific sea surface temperatures and Pacific wind stress, the Southern Oscillation Index and the Quasi-Biennial Oscillation. (Auth. mod.)

I-36885

Ayers, G.P., Ivey, J.P., Goodman, H.S., **Sulfate and methanesulfonate in the maritime aerosol at Cape Grim, Tasmania,** *Journal of atmospheric chemistry,* Mar. 1986 4(1), p.173-185, 15 refs.

High-volume aerosol filters, exposed in maritime air masses at Cape Grim since late 1976, were analyzed for excess sulfate (not of seasalt origin) and methanesulfonate. The mean concentrations (standard errors) of 2.80(0.59) and 0.176(0.027) nmole/cu m respectively are about half those reported in a recent study of aerosol samples from various locations in the Atlantic and Pacific oceans. Tabulated data on methanesulfonate in precipitation at places other than Cape Grim, show values of 85 (nmole/L) in antarctic firn, 10 km inland from Mawson Station during Jan. 1984, and 267, at 62 deg 08'S and 98 deg 57'E, on Jan. 11, 1984, respectively. (Auth. mod.)

I-36886

Chuan, R.L., Palais, J., Rose, W.I., Kyle, P.R., **Fluxes, sizes, morphology and compositions of particles in the Mt. Erebus volcanic plume, Dec. 1983,** *Journal of atmospheric chemistry,* Dec. 1986 4(4), p.467-477, 14 refs.

The flux of particles and their size distribution, determined at Mt. Erebus showed that plume contributes 21 metric tonnes/day of aerosol particles to the antarctic upper troposphere. The aerosol particles consist of larger particles of elemental sulfur and silica, a middle sized group of iron oxides and smaller particles (less than 1 micron) of complex liquids. Unlike many volcanic plumes, the Erebus plume has only a small amount of sulfate particles. The concentrations of particles in the Erebus plumes was 70-370 micron/cu m. Limited sampling of the antarctic atmosphere at 8 km altitude, but hundreds of km away from Erebus, obtained a few large particles of sulfur and silicates, suggesting a similarity with the Erebus plume. The fallout of these particles occurs slowly over a broad area of the antarctic continent. (Auth. mod.)

I-36896

Molina, M.J., Tso, T.L., Molina, L.T., Wang, F.C.Y., **Antarctic stratospheric chemistry of chlorine nitrate, hydrogen chloride, and ice: release of active chlorine,** *Science,* Nov. 27, 1987 238(4831), p.1253-1257, 36 refs.

The reaction rate between atmospheric hydrogen chloride (HCl) and chlorine nitrate (ClONO2) is greatly enhanced in the presence of ice particles. This reaction could play an important role in explaining the observed depletion of ozone over Antarctica; it releases photolytically active chlorine from its most abundant reservoir species, and it promotes the formation of HNO3 and thus removes nitrogen dioxide (NO2) from the gas phase. Hence it establishes the necessary conditions for the efficient catalytic destruction of ozone by halogenated free radicals. In the absence of HCl, ClONO2 also reacts irreversibly with ice with a collision efficiency of about 0.02 at 200 k; the product hypochlorous acid (HOCl) is released to the gas phase on a time scale of minutes. (Auth. mod.)

I-36897

Tolbert, M.A., Rossi, M.J., Malhotra, R., Golden, D.M., **Reaction of chlorine nitrate with hydrogen chloride and water at antarctic stratospheric temperatures,** *Science,* Nov. 27, 1987 238(4831), p.1258-1260, 20 refs.

Laboratory studies of heterogeneous reactions important for ozone depletion over Antarctica are reported. The reaction of chlorine nitrate (ClONO2) with H2O and hydrogen chloride (HCl) on surfaces that simulate polar stratospheric clouds [ice and nitric acid (HNO3)-ice and sulfuric acid] are studied at temperatures relevant to the antarctic stratosphere. A reaction produced gas-phase hypochlorous acid (HOCl) and condensed-phase HNO3; HOCl underwent a secondary reaction on ice producing dichlorine monoxide (Cl2O). In addition to the reaction with H2O, ClONO2 reacted with HCl on ice to form gas-phase chlorine (Cl2) and condensed-phase HNO3. Essentially all of the HCl in the bulk of the ice can react with ClONO2 on the ice surface. The gaseous products of the above reactions, HOCl, Cl2O, and Cl2, could readily photolyze in the antarctic spring to produce active chlorine for ozone depletion. Furthermore, the formation of condensed-phase HNO3 could serve as a sink for odd nitrogen species that would otherwise scavenge the active chlorine. (Auth. mod.)

I-36914

Szeredi, I., Karoly, D., **Vertical structure of monthly fluctuations of the Southern Hemisphere troposphere,** *Australian meteorological magazine,* Mar. 1987 35(1), p.19-30, 9 refs.

Using rawinsonde data from up to 48 stations for the period 1950-1979, the dominant vertical modes of monthly fluctuations of geopotential height, temperature and wind have been identified. Each of these modes has been characterized in terms of fluctuations of each variable at a single level. This has permitted the representation of a large fraction of the variance of monthly fluctuations of the SH troposphere using a small number of variables only. An equivalent barotropic structure was predominant for all variables at higher latitudes. At lower latitudes, a more baroclinic structure was evident although the barotropic mode was still important. An analysis of all variables combined indicates that geopotential height and winds at the 300 hPa level represent well the monthly fluctuations at all levels in the troposphere. Data from Mawson, Casey, SANAE, Argentine Island Stations on the Continent and from various ones of the subantarctic islands were used in the preparation of this analysis. (Auth.)

I-36927

Gaĭgerov, S.S., **Winter variation statistics of antarctic upper air meteorological parameters** [Statisticheskie kharakteristiki zimnikh variatsiĭ meteorologicheskikh parametrov v verkhneĭ atmosfere Antarktiki], *Antarktika; doklady komissii,* 1987 No.26, p.19-24, In Russian. 6 refs.

An analysis is presented of winter variations of meteorological parameters in the stratosphere and mesosphere of antarctic and suban-

tarctic regions based on rocket data obtained at Molodezhnaya Station and the Kerguelen Is. Charts with percentage of probable deviations of regional wind speed and temperature are shown.

I-36928
Gaĭgerov, S.S., **Stratospheric and mesospheric warmings in high latitudes of the Southern Hemisphere** [Stratomezosfernye potepleniia v vysokikh shirotakh iuzhnogo polushariia], *Antarktika; doklady komissii,* 1987 No.26, p.25-29, In Russian. 7 refs.

From meteorological satellite data obtained at different latitudes of the Southern Hemisphere, recordings of midwinter stratospheric warmings, which are often slight and irregular, are discussed. In contrast to the intense warmings associated with changes in circulation in the Arctic, this is not observed in the Antarctic, where significant temperature fluctuations, associated with mesospheric circulation, occur in winter.

I-36929
Koshel'kov, IU.P., Butko, A.I., Kovshova, E.N., **Mean geopotential distribution in the lower thermosphere of the Southern Hemisphere** [Srednee raspredelenie geopotentsiala dlia nizhneĭ termosfery iuzhnogo polushariia], *Antarktika; doklady komissii,* 1987 No.26, p.30-36, In Russian. 11 refs.

Data from average monthly geopotential charts of isobaric surfaces (0.001 and 0.005 mb) were used to study the geopotential spatial distribution and seasonal variations in the lower thermosphere. Charts with amplitudes and phases of annual and semi-annual oscillations are discussed; they show that the most significant interhemispheric differences in the distribution of pressure in the lower thermosphere occur in winter.

I-36930
Koshel'kov, IU.P., Kovshova, E.N., Fedorov, V.V., **Short period variability of temperature and wind velocities in the stratosphere and mesosphere of the Southern and Northern hemispheres** [Vnutrimesiachnaia izmenchivost' temperatury i skorosti vetra v stratomezosfere iuzhnogo i severnogo polusharīĭ], *Antarktika; doklady komissii,* 1987 No.26, p.37-41, In Russian. 10 refs.

Seasonal and altitudinal variations and interhemispheric differences in temperature and wind-speed patterns in the 20-80 km atmospheric layer are analyzed on the basis of meteorological rocket soundings conducted at Molodezhnaya Station, the Kerguelen Is., and 2 northern stations. The values are found to increase during the fall season and with altitude; they are higher in the Arctic in winter, and in the Antarctic in spring. The interhemispheric differences are least pronounced in summer.

I-36931
Tarasenko, D.A., **Temperature variability in the middle atmosphere over the Antarctic** [Izmenchivost' temperatury sredneĭ atmosfery nad Antarktikoĭ], *Antarktika; doklady komissii,* 1987 No.26, p.42-43, In Russian. 8 refs.

Stratospheric and mesospheric temperature variability was studied from rocket sounding data at Molodezhnaya Station. Calculations and variance analysis of recurrence probability of median temperature distribution values show that positive deviations reach the highest values, particularly in the upper stratosphere where often, in winter, the dissipation of planetary waves takes place.

I-36932
IAkovlev, V.N., Al'tman, IU.S., Maklygin, L.G., **Meteorological forecasting for ecological monitoring in the western Atlantic sector of the Antarctic** [Meteorologicheskoe prognozirovanie dlia ekologicheskogo monitoringa v zapadnoĭ chasti atlanticheskogo sektora Antarktiki], *Antarktika; doklady komissii,* 1987 No.26, p.44-52, In Russian. 6 refs.

Described is a method for forecasting 1, 2, 12, and 18 months ahead average monthly values of latitudinal and meridional gradients of atmospheric pressure, and anomaly of long-term structure of atmospheric circulation, in the western Atlantic Ocean. Tabulated results are presented. It is concluded that meteorological forecasting has a practical ecological application.

I-36950
Romanov, V.F., Ariskina, N.V., Vasil'ev, V.F., Lagun, V.E., **Atmospheric energetics in polar regions** [Energetika atmosfery v poliarnykh oblastiakh], Leningrad, Gidrometeoizdat, 1987, 296p., In Russian. Refs. p.282-294.

Experimental data collected during the POLEX program are reviewed and analyzed, covering the following: characteristics of spatial structure of the Antarctic Circumpolar Current, determined by analysis of long series of measurements of currents in the southern ocean; computed zonal mean zonal and meridional components of wind speed representing different seasons; interactions of the atmosphere, ice, and the oceans in polar regions, with emphasis on sea ice, the polar energy balance, and meridional heat exchange processes. Specific to Antarctica, the Soviet-American expedition to the Weddell Sea during Oct.-Nov. 1981 is described in Ch. 4. Atmospheric synoptic eddies and energetics over the sea were studied, including ocean-atmosphere interrelationships such as atmospheric circulation effects on the formation of polynyas in the Weddell Sea. Equations are developed to demonstrate the generation of available potential energy due to turbulent transfer of sensible heat from the ocean to the atmosphere in an ocean cyclone. Charts of cyclone tracks and frequency of cyclones and anticyclones in the Southern Hemisphere are presented.

I-36958
Karoly, D.J., Oort, A.H., **Comparison of Southern Hemisphere circulation statistics based on GFDL and Australian analyses,** *Monthly weather review,* Sep. 1987 115(9), p.2033-2059, 23 refs.

Two sets of observed atmospheric circulation statistics for the Southern Hemisphere (SH) are compared. The first set was compiled at the Geophysical Fluid Dynamics Laboratory (GFDL) and consists of global objective analyses of circulation statistics accumulated at individual rawinsonde stations for the period May 1963-Apr. 1973. The second set was obtained from daily hemispheric numerical analyses prepared operationally at the World Meteorological Centre, Melbourne, Australia for the period Sep. 1972-Aug. 1982. The domain used for the comparison is a 5 deg x 5 deg latitude-longitude grid from 10 deg to 90 deg S and 7 pressure levels from 1000 to 100 mb. The circulation statistics examined include 10-year averages of the monthly mean fields (measures of the mean circulation); ten-year averages of the standard deviations and covariances of daily values (measures of the daily transient eddy variability); and year-to-year standard deviations of the monthly mean fields (measures of the interannual variability). The statistics are presented using horizontal maps on pressure surfaces and latitude-pressure sections of zonal averages. Differences and agreements, horizontal and vertical are discussed. Probable reasons for disagreements and trends characteristic of the variances in the data sets are presented. (Auth. mod.)

I-36960
Jouzel, J., **Simulations of the HDO and H2O-18 atmospheric cycles using the NASA GISS general circulation model: the seasonal cycle for present-day conditions,** *Journal of geophysical research,* Dec. 20, 1987 92(D12), p.14,739-14,760, 67 refs.

The cycles of the water isotopic species (HDO and H2O-18) have been incorporated into the NASA Goddard Institute for Space Studies (GISS) atmospheric general circulation model (GCM). The results of a 2-year simulation for present-day conditions are discussed, with special emphasis on the comparison between predicted and observed isotopic distributions for both the seasonal and annual time scales. The observed seasonal cycles are generally well simulated. For the annual scale the observed linear relationship between *delta* O-18 and the surface temperature at middle and high latitudes, as well as the absence of any correlation between these fields in tropical and equatorial regions, are properly obeyed by the GCM simulation. In the tropical and equatorial regions the *delta* O-18 patterns for both observations and the GCM are influenced by the amount of rainfall. There is excellent agreement between the simulated and observed *delta* D-*delta* O-18 relationship throughout the world. The antarctic regions are included in the analyses shown on the charts of world wide parameters being modelled. (Auth.)

I-36961
Trenberth, K.E., Christy, J.R., Olson, J.G., **Global atmospheric mass, surface pressure, and water vapor variations,** *Journal of geophysical research,* Dec. 20, 1987 92(D12), p.14,815-14,826, 19 refs.

An analysis is made of the mean annual cycle, interannual variability and trends in global-scale water vapor content of the atmosphere for Dec. 1978 through Dec. 1985, using global analyses from the European Centre for Medium Range Weather Forecasts. Two entirely independent global measures of the water vapor content are compared: the total surface pressure due to water vapor from humidity analyses and the total surface pressure itself. For the mean annual cycle these show excellent agreement, and the analyses are therefore compatible with the constraint that the total mass of dry air is conserved. A new estimate of the total mass of the atmosphere is made for the annual mean, corresponding to a mean surface pressure of 984.43 mbar. It ranges from a higher value in July to a lower one in Jan. owing to the annual cycle in global water vapor which has an amplitude of 0.2 mbar. The total mass of dry air is estimated to be 981.9 mbar. Available evidence indicates that the analyzed global monthly anomalies are mostly noise. (Auth. mod.)

I-36973
Zurer, P.S., **Complex mission set to probe origins of antarctic ozone hole,** *Chemical and engineering news,* Aug. 17, 1987 65(33), p.7-13.

The airborne Antarctic Ozone Experiment research program to explain the antarctic ozone hole is described. It consists of an international group of 160 scientists, engineers and technicians and 2 planes destined to carry out a total of 21 experiments in 10 data gathering missions, from Punta Arenas, Chile, between Aug. 17 and the end of Sep., 1987. Ozone measurements, determination of temperature profile and aerosol content of the stratosphere, as well as measurement of the concentration of key chemical substances, are part of the activities listed. Chlorine based ozone hole theories, depending on heterogeneous reactions, are explained.

I-36982
Slotten, H.R., Stearns, C.R., **Observations of the dynamics and kinematics of the atmospheric surface layer on the Ross Ice Shelf, Antarctica,** *Journal of climate and applied meteorology,* Dec. 1987 26(12), p.1731-1743, 15 refs.

Ross I. with its 3000 m volcanic peaks poses a prodigious barrier to the predominant southerly airflow of the western Ross Ice Shelf. This study investigates the relationship of Ross I. to the dynamics and kinematics of the atmosphere using surface data from an array of 6 automatic weather stations on the Ross Ice Shelf just south of Ross I. After the actual horizontal pressure gradients had been determined, dynamical relations were obtained which confirmed previous related research. The values of geostrophic departure angle found in this study are in good agreement with the findings of other researchers. Furthermore, a previously determined tendency of the geostrophic departure angle to increase with increasing wind speed over open ice has been confirmed in the region far to the south of the influence of Ross I. Near the south side of Ross I., however, this relation does not apply. It is postulated that the forcing of Ross I. on the dynamics of the lowest layers of the atmosphere is causing this difference to occur. Through an analysis of the individual terms in the equation of motion, further support was found for this hypothesis. On the assumption of a linear decrease of friction with height, the height for zero friction increases towards the south of Ross I. Finally, tentative evidence of higher pressure immediately to the south of the island has been found, which further supports the theory that the cold stable air advected northward by the predominant southerly flow is piling up on the south side of Ross I. (Auth.)

I-36983
Gube-Lenhardt, M., **Meteorological data of the Georg von Neumayer Station for 1983 and 1984,** *Berichte zur Polarforschung,* 1987 No.38, 108p., 1 ref.

This report describes the meteorological conditions at the Georg von Neumayer Station for the years 1983 and 1984. The data compiled, archived, and presented in this report are in close agreement with the previous issue on this subject (Gube-Lenhardt and Obleitner, 1986). Specific topics briefly reported are: instrumentation, air temperature, pressure, humidity, cloudiness, wind speed and direction, vertical temperature gradient, temperature inversions, global radiation, long wave radiation flux, albedo, radiation budget, upper air temperature, mixing ratio, winds, layer thicknesses, and tropopause height.

I-36985
Rabe, W., **Weather and synoptic situation during Winter Weddell Sea Project 1986 (ANT V/2) July 16-September 10, 1986,** *Berichte zur Polarforschung,* 1987 No.40, 161p.

The meteorological situation during the cruise of RV *Polarstern* into the deep antarctic ice pack in winter 1986 is described. Hand drawn analyses of surface pressure charts over the Atlantic sector of the southern ocean, radiosonde data and 3 hourly weather observations give an overview for each day from July 16 to Sep. 10. Typical periods in development and behavior of synoptic systems are discussed, and mean surface pressure charts and storm tracks are presented. (Auth.)

I-36987
Ghil, M., **Predictability of planetary flow regimes: dynamics and statistics,** Toward understanding climate change. The J.O. Fletcher lectures on problems and prospects of climate analysis and forecasting, edited by U. Radok, Boulder, Westview Press, 1987, p.91-147, Refs. p.143-145.

DLC QC981.8.C5T65

Regimes of low-frequency variability in large-scale atmospheric dynamics are considered. The model used for the study of these regimes is the fully-nonlinear, equivalent-barotropic vorticity equation on the sphere, with simplified forcing, dissipation and topography. Based on recent ideas from dynamical system theory, it is shown that the system's macrodynamics can be described by two or more planetary flow regimes, the expected residence time in each regime, and the transition probabilities from one regime to another.

These model-derived ideas are tested by applying them to a time series of atmospheric data from the Southern Hemisphere. The effect of anomalous boundary conditions on planetary flow regimes and their predictability is discussed and perspectives for practical long range forecasting are foreshadowed. (Auth. mod.)

I-36994

Carleton, A.M., **Antarctic climates,** Encyclopedia of earth sciences, volume 11, The encyclopedia of climatology, edited by J.E. Oliver and R.W. Fairbridge, New York, Van Nostrand Reinhold, 1987, p.44-64, Refs. p.60-63.

DLC QC854.E525

The presence of ice as a climatic factor in polar regions opens this review, following with radiation climates and the energy balance, climatic variables, large scale atmospheric circulation, and synoptic processes. Numerous tables and illustrations, with data such as the physical environment of the Antarctic, distribution of global solar radiation, surface albedo, radiation balance, ice thickness distribution, surface temperature, cloud cover, wind speed, and geopotential height, are presented.

I-37001

Rabtsevich, S.V., **Homogeneous group processes controlling early cold and late warm autumn in East Antarctica** [Gruppovye odnorodnye protsessy, opredeliaiushchie ranniuiu kholodnuiu i pozdniuiu tepluiu osen' v Vostochnoĭ Antarktide], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1984 Vol.79, p.95-103, In Russian. 4 refs.

Analysis of 1957-1979 data shows 4 groups of homogeneous development of atmospheric processes in East Antarctica. Comparative characteristics of 2 groups separating the early, cooler autumn from the later, warmer, autumn by recurrence of circulation patterns, and pressure and temperature anomalies over a period of 8 months, Oct. to May. Of these, Oct. to Feb. is used as background period and Mar. to May as prognostic period.

I-37002

Savitskiĭ, G.B., Riabkov, G.E., **Use of variability ranges of meteorological elements in 3-day weather forecasts for Antarctica** [Uchet predelov izmenchivosti meteorologicheskikh elementov v prognozakh pogody na troe sutok dlia Antarktidy], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1984 Vol.79, p.103-106, In Russian. 2 refs.

Statistical analysis of recurrence of predominant values of wind speed and direction and of atmospheric temperature at antarctic stations is presented. Ranges obtained, and evaluation criteria which can be used in 3-day weather forecasts, are given.

I-37003

Kuchumova, L.S., **Vertical eddy heat fluxes in the atmosphere at the southern ocean water surface (summer 1980)** [Vertikal'nye turbulentnye potoki v atmosfere u poverkhnosti vody IUzhnogo okeana (leto 1980 g.)], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1984 Vol.79, p.106-119, In Russian. 9 refs.

Data from standard hydrological and meteorological investigations on board the *Professor Vize,* cruising in the southern ocean from Nov. 15, 1979 to Apr. 15, 1980, are presented. The dependence of heat fluxes in the antarctic and subantarctic areas on synoptic conditions, atmospheric and hydrological frontal separations, latitude, and climatic zone, is analyzed.

I-37009

Reinsel, G.C., **Analysis of the 7-year record of SBUV satellite ozone data: global profile features and trends in total ozone,** *Journal of geophysical research,* Feb. 20, 1988 93(D2), p.1689-1703, 15 refs.

An analysis of Nimbus 7 solar backscattered ultraviolet (SBUV) monthly average total ozone data for changes over the 7-year period from Nov. 1978 through Sep. 1985 is considered. Regression-time series models, which include seasonal components, a linear trend term, a solar flux term, and an autocorrelated autoregressive noise term to account for variations in total ozone, are estimated for both latitudinal zonal averages and a global series over this time period. The resulting linear trend and solar flux coefficient estimates are examined. A comparison between SBUV monthly average total ozone data near Dobson ground station locations and the corresponding Dobson station total ozone data is performed for a network of 35 Dobson stations. Linear drifts are estimated for the differences between SBUV and Dobson total ozone data at each station. The results show an average negative linear drift in SBUV data relative to Dobson data of about -0.4% per year. A linear trend estimate for the global SBUV series of (-0.74% per year) is obtained for the model which takes into account the association of ozone changes with solar flux variations. When this linear trend estimate for the global SBUV series is "corrected" for the negative drift between SBUV and Dobson data, the 95% confidence interval estimate over this 7-year period is -0.35% per year. The many charts and diagrams include data from Antarctica reflecting the recent trend of the thinning spring time ozone layer there. (Auth. mod.)

I-37015

Weisburd, S., **Ozone reports stir debate,** *Science news,* Jan. 9, 1988 133(2), p.20.

Recent papers on ozone depletion are briefly reviewed. Various researchers, including a spokesman for a newly formed International Ozone Trends Panel, comment on what has been learned. Uncertainty yet prevails.

I-37018

Zurer, P.S., **Antarctic ozone hole: complex picture emerges,** *Chemical and engineering news,* Nov. 2, 1987 65(44), p.22-26.

An account of the follow-up considerations is given to NASA's Airborne Antarctic Ozone Experiment, which gathered chemical and meteorological data from the ozone hole between mid-Aug. and end of Sep., 1987. It is found that the rate of destruction of ozone is about the same within as outside the region of high chlorine monoxide, supporting the notion that something more than chlorine photochemistry—perhaps a change in atmospheric circulation—is affecting antarctic ozone. The chemical processes which could account for ozone depletion, and biologists' assessment studies of the ozone hole's effect on ecology, are discussed.

I-37028

Sokolov, S.T., **Synoptic conditions in exceptionally warm weather in East Antarctica in summer 1973-1974** [Sinopticheskie usloviia ekstremal'no teploĭ pogody v Vostochnoĭ Antarktide letom 1973/74g.], *Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy,* 1986 Vol.276, p.56-65, In Russian. 15 refs.

The unusually warm summer of 1973-1974 in East Antarctica, with record temperatures, on the surface as well as up to 7-8 km in the troposphere, is discussed. Tables and charts are presented showing the following: maximum temperatures at east antarctic stations during Jan. 1974, with comparison to absolute maxima in Jan. of preceding years; maximum geopotential and surface temperature val-

ues, at 500 gPa, in Jan. 1974, with comparison with long period averages; the anticyclone trajectory during 12 hours on Jan. 9, 1974, with center location on Dec. 31, 1973 to Jan. 12, 1974, and global surface cyclone and anticyclone trajectories; and synoptic data for Jan. 8, 1974. An analysis of atmospheric processes contributing to the unusual climatic conditions is offered.

I-37029

Ryzhakov, L.IU., Rabtsevich, S.V., **Intensity of zonal and meridional atmospheric transfers in the Southern Hemisphere** [Kharakteristika intensivnosti zonal'nykh i meridional'nykh perenosov v atmosfere iuzhnogo polushariia], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.393, p.110-122, In Russian. 13 refs.

Computation of AT500 gradients and surface pressure values for 1960-1979 is presented. Yearly variations of meridional gradient values characterizing the intensity of zonal transfers are shown in long period averages and in a given year. Based on 2-year data, it is found that monthly average meridional gradient anomalies relate to pressure and temperature anomalies. It is suggested that this data could be used in weather forecasting in Antarctica.

I-37030

Savitskiĭ, G.B., Fedosov, M.K., Riabkov, G.E., **Principles of change of macro-synoptic processes of the Southern Hemisphere and weather characteristics in Antarctica** [Zakonomernosti preobrazovaniia makrosinopticheskikh protsessov iuzhnogo polushariia i pogodnye kharakteristiki v Antarktike], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.393, p.122-128, In Russian. 4 refs.

Determination of long term changes and daily recurrence of typical synoptic processes, related to forms of atmospheric circulation in the Southern Hemisphere, is reported. Tabulated data covering 16 years, from 1965 to 1980, are analyzed showing a continuity in the types of synoptic processes and related regimes useful in antarctic weather forecasting.

I-37033

Renerie, J., **United States' national ozone expedition statement,** *Environmental conservation,* Winter 1986 13(4), p.353-355.

Based on a report in May 1985 that the springtime antarctic ozone abundance was about 50% smaller than that present in 1975, the ozone hole and various possible clues to its formation are discussed. A U.S. interagency expedition to Antarctica, designed to measure ozone contents in addition to chemicals such as nitric acid and hydrochloric acid in the atmosphere, is reported. A sketch map indicating total stratospheric ozone on Oct. 10, 1986, with a shield of less than 200 Dobson units over much of Antarctica and most of the rest of the continent, and wide expanses of ocean beyond covered by only 250 units, is provided. The preliminary conclusion is reached, that the cause of the ozone hole phenomenon "may well be something that has not yet been thought of."

I-37058

Hofmann, D.J., Rosen, J.M., Harder, J.W., **Aerosol measurements in the winter/spring antarctic stratosphere. 1. Correlative measurements with ozone,** *Journal of geophysical research,* Jan. 20, 1988 93(D1), p.665-676, 26 refs.

From Aug. 25 to Nov. 3, 1986 aerosol profiles were measured on 6 occasions at McMurdo Station by balloon-borne optical particle counters. In addition, condensation nuclei profiles were measured on 3 occasions. Several of these measurements corresponded to times when McMurdo was located near the point of minimum springtime ozone, as indicated by ozone and temperature measurements. The height of the stratospheric sulfate layer decreased over the period of measurement, indicating continued subsidence in the vortex while the ozone was decreasing. This suggests that upwelling in the vortex is not important in the ozone depletion process. Low concentration of condensation nuclei in the region of the ozone minimum supports this conclusion. Enhanced condensation nuclei above 20 km in the vortex and the discovery of an apparent permanent layer in the springtime vortex at the top of the ozone depletion region suggests that they may be related to the ozone depletion process, although the nature of this relationship is not clear. (Auth.)

I-37059

Rosen, J.M., Hofmann, D.J., Harder, J.W., **Aerosol measurements in the winter/spring antarctic stratosphere. 2. Impact on polar stratospheric cloud theories,** *Journal of geophysical research,* Jan. 20, 1988 93(D1), p.677-686, 28 refs.

A series of aerosol soundings sensitive to particle sizes less than about 1 micron was made from McMurdo beginning in Aug. 1986, while the stratosphere was still cold, and continued through the spring warming and polar vortex circulation breakdown. No unusual or definitive features in the profiles were noted that could unquestionably be associated with PSCs. Photographically documented ground observations indicate that there was very likely a PSC or unusual stratospheric aerosol condition present during the first sounding at about 20 km. These aerosol observations impact the present explanations of PSCs and indicate that the possibility of these clouds being made up of low concentrations of relatively large (greater than 5 micron) particles must be taken seriously. The low concentrations would effectively render the PSCs undetectable by the aerosol-sounding equipment employed in this study. It is argued that the fall speed associated with the cloud particles would not measurably change the natural aerosol profile, but that there could be a tendency for some water vapor to be transported to lower altitudes. Because of atmospheric mixing and transport processes, the redistribution of water vapor may not be easily detected. (Auth.)

I-37070

Savitskiĭ, G.B., Beliazo, V.A., Riabkov, G.E., Fedosov, M.K., **Terminology and evaluation of accuracy of 3-day weather forecasts in Antarctica** [K voprosu o terminologii i otsenke opravdyvaemosti prognozov pogody na troe sutok dlia Antarktiki], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.58-63, In Russian. 3 refs.

Basic prognostic relationships among atmospheric processes are established from the tropospheric thermobaric structure and its variations and from certain associations of the processes with stream flows. Methods are suggested for prognoses, and evaluation of their accuracy, of direction and speed of wind and of prevailing air temperatures.

I-37071

Sakunov, G.G., Mishin, A.A., Radionov, V.F., **Anomalous decrease of atmospheric transparency over Antarctica** [Anomal'noe ponizhenie prozrachnosti atmosfery nad Antarktidoĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.66-69, In Russian. 5 refs.

Data from investigations carried out at Mirnyy Station in Jan.-Mar. 1983, during the 28th Soviet Antarctic Expedition, show a significant decrease of atmospheric transparency for that period. In Jan., the monthly average values were approximately 6% lower than the long period averages recorded at Molodezhnaya and Novolazarevskaya stations. This decrease was observed to have begun in Nov.

1982, and is attributed to increased aerosol content in the atmosphere. Effects of the Apr. 4, 1982, eruption of El Chichon on the visual atmospheric anomaly are considered.

I-37072

Dolgin, M.I., Buts, A.A., **Effect of cloudiness on the incoming global radiation** [Vliianie oblachnosti na postuplenie summarnoĭ radiatsii v Antarktide], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.69-72, In Russian. 5 refs.

Formation conditions and features of the radiation climate in Antarctica are reviewed. The dependence of solar radiation on cloud cover distribution is discussed. The reduction of global radiation as a result of cloudy conditions, investigated at 200, 350 and 1100 m altitude—called the lower, middle and upper cloud layer, respectively —is reported.

I-37074

Pavlov, A.IU., **Hydrometeorological regime of the southern ocean in summer 1982-1983** [Gidrometeorologicheskiĭ rezhim IUzhnogo okeana letom 1982-1983], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.80-83, In Russian. 6 refs.

Results of hydrometeorological investigations, carried out in the low pressure zone at 61-62S by the 28th Soviet Antarctic Expedition during Dec. 1982-Apr. 1983 are given as follows: lowest pressure, 969 mbar; wind speed, 25 m/sec; height of the swell, 7 m. Long period averages for recurrence of basic hydrometeorological characteristics are compared to the expedition's data, which are tabulated and discussed. In considering navigation conditions, it is found that the higher the latitude, the lower the visibility, while precipitation increased from 29% at 40-50S, to 42% at 50-60S and to 50% south of 60S in relation to long-period averages. The highest precipitation ratio was found in the coastal waters of the Pacific sector, where it exceeded 58%. Precipitation in the coastal areas of the continent consists of short snowfalls of 10-20 min. duration. Data on sea ice distribution show the highest concentration of icebergs to occur in the Davis Sea, where they drift at an average speed between 0.4 to 0.9 knots, but sometimes reaching 2 knots.

I-37080

By radio from Antarctica [Po radio iz Antarktiki], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1987 Vol.109, p.112-115, In Russian.

Presented is a month-by-month table of meteorological data—atmospheric pressure and temperature, wind speed, relative humidity, cloudiness and mean height reached by radiosondes—recorded at each of the 7 Soviet stations from Jan. through Dec., 1985.

I-37082

Prather, M.J., Rodriguez, J.M., **Antarctic ozone: meteoric control of HNO3,** *Geophysical research letters,* Jan. 1988 15(1), p.1-4, 32 refs.

Atmospheric circulation leads to an accumulation of debris from meteors in the antarctic stratosphere at the beginning of austral spring. The major component of meteoric material is alkaline, comprised predominantly of the oxides of magnesium and iron. These metals may neutralize the natural acidity of stratospheric aerosols, remove nitric acid from the gas phase, and bond it as metal nitrates in the aerosol phase. Removal of nitric acid vapor has been previously shown to be a critical link in the photochemical depletion of ozone in the antarctic spring, by allowing for increased catalytic loss from chlorine and bromine. (Auth.)

I-37083

Leu, M.-T., **Laboratory studies of sticking coefficients and heterogeneous reactions important in the antarctic stratosphere,** *Geophysical research letters,* Jan. 1988 15(1), p.17-20, 16 refs.

Laboratory studies of sticking coefficients of H2O, HCl, Cl2 and HNO3 on ice and heterogeneous reactions of ClONO2 with ice or HCl/ice have been performed in a fast flow reactor. A quadrupole mass spectrometer with electron impact ionization was used as a detector. The reaction probability of ClONO2 on ice was 0.06 while HOCl was observed as a sole product in the gas phase. With HCl present in ice, the reaction probability of ClONO2 is greatly enhanced, approaching 0.27 (+0.73, -0.13) while moleuclar chlorine was the major product in the gas phase. Another reaction product was nitric acid which remained in the solid phase. Since the polar stratospheric clouds contain ice particles or possibly HCl/ice particles on the surface, the present results should be a major factor in producing the observed springtime ozone depletion in the antarctic stratosphere. (Auth. mod.)

I-37088

Hanson, C.S., ed, Spears, C.R., ed, **Workshop on the U.S. Antarctic Meteorological Data Delivery System,** *World Data Center A for Glaciology. Glaciological Data. Report,* Jan. 1988 GD-20, 76p., 8 refs. Includes comments by P. Dalrymple, D. Bromwich, W. Smythe, and G. Scharfen.

Concerns over access to meteorological data from U.S. antarctic stations have been the subject of much discussion among organizations closely involved in weather matters. Several factors have apparently led to a somewhat confused picture of data access in the minds of potential data users: delays in data receipt both at the ultimate archive(s) and at transmission stations along the route to the archive(s); non-standardized reporting methods and formats; no permanent archive for the data in question; no permanent source of funding to process and archive the data; and archive locations not widely known within the research community. This workshop was convened to address these problems. To that end, participants examined antarctic data inventories from the National Climatic Data Center, National Center for Atmospheric Research, Naval Postgraduate School, Comprehensive Ocean-Atmosphere Data Set, U.S. Interim Climate Data Inventory, and the National Snow and Ice Data Center. About 25 recommendations emerged from the conference and these urged all interested parties to increase the antarctic meteorological measurement capability, gather more data through wider and better use of current technology, subject the data to rigid quality control processes, communicate the results to using agencies and archives, and let researchers and other users know who has what and how to gain access to it.

I-37090

Rees, J.M., **Propagation of internal gravity waves in the stably stratified atmospheric boundary layer,** *Annales geophysicae,* Oct. 1987 5B(5), p.421-432, 13 refs.

Under conditions of strong stable stratification in the atmospheric boundary layer, the smaller scale turbulence is often accompanied by larger scale organized wave activity. This is probably due to Kelvin-Helmholtz instability. An extreme example occurs in the Antarctic, where stable stratification is common and there may be a temperature difference over the lowest 10 m of as much as 10 C. Observations of strong wave activity occurring under these conditions are described. A numerical study has been undertaken to examine the propagation of such waves. The model solves the unsteady, Boussinesq equations in two dimensions with parameterized turbulence depending on the larger scale flow. A comparison of the waves predicted by the numerical model and those observed in the Antarctic is

given. It is shown that only waves with a wavelength greater than some critical value are likely to propagate to the ground. This is in agreement with a prediction made by McIntyre and Weissman (1978). (Auth.)

I-37101
Elliott, S., Rowland, F.S., Stolarski, R.S., Schoeberl, M.R., **Comment on "Further interpretation of satellite measurements of antarctic total ozone",** *Geophysical research letters,* Feb. 1988 15(2), p.196-199, Includes reply by Schoeberl and Stolarski (SS). 11 refs. For the paper being discussed see I-34957.

The purpose of the comment by ER is to maintain that the best explanation for the 1980-1982 TOMS data, which showed deeper ozone "holes" than in 1979, is a near-cancellation between an ozone source and a newly developed chemical sink for ozone, with both initiated by the arrival of spring in the Southern Hemisphere. SS dispute this by stating that reprocessed data for 1979-1982 and data for 1983-1986 are now available and that these data confirm a significant decline in mid-latitude ozone during the past decade.

I-37102
Yoden, S., Shiotani, M., Hirota, I., **Multiple planetary flow regimes in the Southern Hemisphere,** *Meteorological Society of Japan. Journal,* Aug. 1987 65(4), p.571-585, 29 refs.

An observational study is made of low-frequency variations of the general circulation in the Southern Hemisphere troposphere with the aid of daily data analyzed at the National Meteorological Center (NMC). In the winter of 1983 there exist two typical patterns of the zonal mean geostrophic wind in the meridional plane. They are named the single jet regime and the double jet regime, each of which persisted with a characteristic duration of a month and appeared twice alternatively. In the single jet regime, the subtropical jet at the tropopause level is strong and the stationary wave of zonal wavenumber (WN=) 3 has a larger amplitude than WN=2. On the other hand, in the double jet regime the subtropical jet is weak and the polar night jet extends down to the surface at about 55 deg S. Dominant stationary planetary waves are WN=1 and 2. These two regimes are also observed in the 3 years 1980-1982. An empirical orthogonal function (EOF) analysis is made to define an index of the zonal mean wind of 2 dimensions. The first component of EOF, which represents over 40% of the total variance, corresponds to the variances between the two regimes. The amplitude of this component is used as a kind of 'zonal index'. The transition between the regimes is rather rapid compared with the duration of each regime. No clear relation is found between the regime transitions and the annual variation. These observational evidences support an interpretation that this low-frequency variation of the zonal index is the transition between multiple planetary flow regimes in the Southern Hemisphere. The data are analyzed for latitudes to 80S. (Auth. mod.)

I-37103
Dickinson, R.E., Meehl, G.A., Washington, W.M., **Ice-albedo feedback in a CO2-doubling situation,** *Climatic change,* July 1987 10(3), p.241-248, 8 refs.

The feedback of sea-ice change to the warming from CO2-doubling is estimated using the simulation of Washington and Meehl (1984). Without ice-snow albedo feedback, their global warming of 3.5 C would have been 2.2 C according to the present estimate of the ice-snow feedback. About 80% of the albedo change from ice and snow occurred in the Southern Hemisphere. Whether this change was an overestimate will require further study. (Auth.)

I-37108
Kitano, Y., Tanaka, M., **Atmospheric carbon dioxide problem,** *Oceanus,* Spring, 1987 30(1), p.78-82, 8 refs.

Carbon dioxide-induced climate change and its influence on the world food supply and sea level rise are discussed. Atmospheric sources and sinks of CO2 are identified and a new apparatus for continuous measurement of atmospheric CO2 levels, developed at Tohoku University, is described. Tropospheric CO2 measurements documented over Japan are summarized, as are antarctic and Pacific measurements. Data from Showa Station show that a regular diurnal variation was not observed; a seasonal variation was observed with the minimum concentration in mid-Apr. and the maximum in mid-Oct.: annual mean concentrations were 341.2 and 342.6 ppm for the years 1983 and 1984, respectively; and irregular variations were sometimes observed with extremely small amplitudes of 0.2 ppm. It is concluded that despite the large amount of accumulated data, it remains difficult to evaluate quantitatively the net exchange rate of CO2 between the global atmosphere and the ocean.

I-37130
Mullen, D.P., **Forecasting for the frigid desert of Antarctica,** *Weatherwise,* Dec. 1987 40(6), p.304-311.

A former forecaster with Operation Deep Freeze reflects on the problems and challenges of weather forecasting for flight operations at the terminals and en route within the continent and the N-S route between McMurdo and Christchurch. The lack of weather patterns, reporting stations, radar, and facsimile chart data all emphasize the need for sound individual judgment on the part of the forecaster. A set of 27 forecasting rules has been developed and these, judiciously applied, in conjunction with improving satellite data have removed most of the dart-throwing aspects of weather forecasting in Antarctica.

I-37142
Lagun, V.E., Romanov, V.F., IAzev, A.I., **Climatic eddies in the atmosphere of the Southern Hemisphere,** *Soviet meteorology and hydrology,* 1987 No.10, p.8-17, Translated from Meteorologiia i gidrologiia. 23 refs.

Presented are the results of diagnostic investigations of eddy dynamics and energetics of the Southern Hemisphere according to climate data. Analysis of statistical parameters of eddy dynamics and energetics revealed the presence of regions of synoptic activity (SAR) in which the frequency of synoptic eddies (SE) is much higher than the global average and the entire life cycle of most SE takes place. At the southern boundary of the cyclonic climatic eddies (CCE) the meridional movement of the CCE is blocked by ridges of the antarctic anticyclone, as well as by unfavorable conditions for their further movement to the south in connection with the orography, the influence of sea ice, and the antarctic ice shield. Within SAR synoptic eddies are stable, reach maximal intensity, and form climatic eddies (CE) in climatic fields which are similar in structure, dynamics, and energetics to typical SE. The seasonal features of the behavior of CE are studied. It is shown that energy-active regions are localized in CE, about the mechanisms of formation of CE. (Auth. mod.)

I-37143
Bugaeva, I.V., Riazanova, L.A., Butko, A.I., **Stratospheric and mesospheric processes over the Southern Hemisphere in winter 1985,** *Soviet meteorology and hydrology,* 1987 No.10, p.89-92, Translated from Meteorologiia i gidrologiia. 3 refs.

Analysis of radiosonde and rocket data for Molodezhnaya Station, in conjunction with SATEM satellite measurements in winter 1985, established the presence of anomalous warmings in the stratosphere and mesosphere of the Southern Hemisphere which occur on a change in the meteorological fields. The formation of heat is initially observed at mesospheric levels, then descends into the stratosphere. In this case the penetration of heat into the subjacent layers did not take place. Maximal heating was noted in the layer of 35-45 km and was more than 40 C. (Auth.)

I-37144
Borisenkov, E.P., **Ozone hole over Antarctica,** *Soviet meteorology and hydrology,* 1987 No.10, p.97-104, Translated from Meteorologiia i gidrologiia. 11 refs.

The available factual data for 1979-1985 which characterize the development of an ozone hole in the antarctic ozonosphere are analyzed. Discussed are existing theories about the mechanisms which determine the formation and dynamics of the ozone hole based on published materials and discussions of this problem at a special seminar in Aspendale (Australia) in Dec. 1986. It is shown that of the 3 proposed mechanisms for the formation of the ozone hole the most preferable is related to solar activity. However, it is still too early to accept unequivocally a given hypothesis for explaining this process. (Auth.)

I-37146
Van Heerden, J., **Analysis of the 1000-300 hPa thickness field using satellite imagery,** *South Africa. Weather Bureau. Technical paper,* Oct. 1985 No.15, 27p., 6 refs.

The paper covers particularly the portion of the Southern Hemisphere of meteorological interest to South Africa including the antarctic region. The thickness analysis is based on the interpretation of cloud conditions which appear on satellite imagery. A set of five basic interpretive principles is presented and from these principles are derived all other analysis rules. Physical and mathematical justification is provided for these precepts and their applications are summarized. The basic interpretive principles identify indicators of warm advection, upper air ridges, cold advection and subsidence, weak thermal advection, upper level divergence, and vorticity. The analysis rules developed from these principles are applied to such parameters among others, as vertical motion fields, locations of cold pools, vertical shear, ridge axes and widths, frontal bands, and surface vortices.

I-37160
Burova, L.P., Gromov, V.D., Luk'ianchikova, N.I., Sholomitskiĭ, G.B., **Low humidity and submillimeter transparency above the Vostok antarctic station,** *Soviet astronomy letters,* Sep.-Oct. 1986 12(5), p.339-341, Translated from Pis'ma v astronomicheskiĭ zhurnal. 8 refs.

Radiosonde aerological data measured above Vostok, the Soviet station in East Antarctica, testify to an exceptionally low integrated humidity on clear days: the annual mean precipitable water content is 0.35 mm, dropping to 0.20 mm in the winter. The atmosphere at Vostok is dry enough for radiation from cosmic sources to be observable in the 1.63-mm H2O line and in several transparency windows between 300 and 200 microns.

I-37169
Pecherzewski, G., **Air pollution and natural sedimentation from the atmosphere in the region of the Admiralty Bay (South Shetland Islands),** *Polish polar research,* 1987 8(2), p.145-151, 26 refs.

Results of studies on air pollution and natural sedimentation from the atmosphere in Admiralty Bay are presented. The amount of dust in the air varied from 0.11 to 10.90 microgram/cu m (the mean being 3.70 microgram/cu m). The total amount of substances transported from the atmosphere in the Admiralty Bay region was estimated at 12.7 t/sq km per year; the precipitation transporting 2.5 t/sq km per year in the same area. Preliminary data on the contents of Cu, Cd, Co, Ni, Pb and Zn in the samples of surface waters, snow and rain in the Admiralty Bay region are presented and compared with the results of the authors. (Auth.)

I-37175
Komhyr, W.D., **ECC ozonesonde observations at South Pole, Antarctica, during 1987,** *U.S. National Oceanic and Atmospheric Administration. NOAA data report,* Mar. 1988 ERL ARL-15, 319p., PB87 207502, 15 refs.

Atmospheric ozone vertical distribution, air temperature, and wind speed and direction data are presented for 76 balloon electrochemical concentration cell (ECC) ozonesonde measurements made over the South Pole in 1987. Observations were made year-round at a frequency of one sounding a week; more often during late Aug. to late Nov., the time of formation and persistence of the "ozone hole" over Antarctica. Pressure, altitude, ozone, temperature, dew point, humidity, potential temperature, and wind data are presented at one-minute intervals for each of the soundings, together with vertical profile plots of ozone, air temperature, and wind data. The construction and operation of the ECC ozonesonde are described; flight procedures, data processing, ozone measurement uncertainties, and data presentation are discussed and archiving information is provided. (Auth. mod.)

I-37201
Faure, H., **Amplifying mechanism for the climatic cycle: the "sea ice lid effect" controls the changes in atmospheric carbon dioxide** [Mécanisme d'amplification du cycle climatique global: l'effet de couvercle de la glace de mer contrôle le CO2 atmosphérique], *Académie des Sciences, Paris. Comptes rendus. Ser.2,* July 30, 1987 305(6), p.523-527, In French with English summary. 23 refs.

Sea-ice extension at the end of a glacial cycle constitutes a CO2-tight lid on the cold oceanic surface waters of both hemispheres. Thus, the global ocean is no longer a sink for atmospheric CO2 because of this "sea-ice lid effect". The rapid increase of CO2 in the atmosphere, together with a rise in sea level is responsible for the accelerated temperature increase and sea-ice melting. The cold oceans, freed from their ice lid can become a CO2 sink. A new glacial cycle may thus be triggered. (Auth.)

I-37216
Parrish, A., **Extremely low N2O concentrations in the springtime stratosphere at McMurdo Station, Antarctica,** *Nature,* Mar. 3, 1988 332(6159), p.53-55, 21 refs.

Frequent measurements have now been made of stratospheric nitrous oxide using the Stony Brook millimetre-wave remote sensing spectrometer at McMurdo Station as part of the investigation of the 'ozone hole'. These measurements show N2O mixing ratios that are less than 1/5 at 20 km, and less than 1/10 at 25 km of those measured during the antarctic summer. Observed mixing ratios are also much less than those predicted by global-scale models of stratospheric chemistry and dynamics. As the N2O signal remained very weak when McMurdo was at the edges of the ozone hole and showed no signs of recovering during Oct., it is concluded that the geographical and temporal extent of the region of low N2O is comparable to, or greater than that of the ozone hole. The results argue against theories that require springtime upwelling to explain the antarctic ozone hole, and suggest that the air in the antarctic lower stratosphere during late winter and early spring has been subjected to considerable downward transport. (Auth. mod.)

I-37217
Heath, D.F., **Non-seasonal changes in total ozone column from satellite observations, 1970-1986,** *Nature,* Mar. 17, 1988 332(6161), p.219-227, 29 refs.

Analyses of non-seasonal changes in total column ozone from satellite observations during the period 1970-86 suggest, when com-

bined with analyses of Dobson network data, that the largest reduction in global ozone since 1959 occurred between 1978 and 1986. The existence of an arctic region of enhanced ozone depletion with similar but less pronounced characteristics of the antarctic region is described. Before 1983 large rates of decrease were confined to high latitudes, subsequently regions of large rates of ozone depletion have appeared at mid-latitudes. Comparisons are made between Northern and Southern Hemispheres on the basis of measurements over the equatorial regions, mid-latitudes north and south, and both polar regions. (Auth. mod.)

I-37218

Khalil, M.A.K., Rasmussen, R.A., **Carbon monoxide in the Earth's atmosphere: indications of a global increase,** *Nature,* Mar. 17, 1988 332(6161), p.242-245, 20 refs.

Increasing levels of CO can lead to an increase of tropospheric O3 and a build-up of many other trace gases in the Earth's atmosphere, which may in turn cause widespread perturbations of tropospheric chemistry, global warming and other climatic changes. During the past 6-8 years systematic measurements have been taken of CO at sites ranging from within the Arctic Circle to the South Pole. The rates of increase of the globally averaged concentration are between 0.8% and 1.4% per year depending on the statistical method used for estimating the trends. These increases may have gone on for much longer because more than half of the atmospheric CO now comes from anthropogenic sources. The rates of increase are largest at mid-northern and tropical latitudes, where most of the sources are located. (Auth. mod.)

I-37230

Abramov, R.V., **Large-scale dynamic characteristics of the subantarctic atmosphere over the Atlantic and Indian oceans** [O krupnomasshtabnykh dinamicheskikh kharakteristikakh atmosfery Atlantiko-Indookeanskoĭ Subantarktiki], *Vsesoiuznyĭ nauchno-issledovatel'skiĭ institut gidrometeorologicheskoĭ informatsii-mirovogo tsentra dannykh. Trudy,* 1986 No.122, p.71-79, In Russian. 4 refs.

Results are presented of an analysis of atmospheric pressure fields, averaged on 10 consecutive weeks between 35 and 60S, over the Atlantic and Indian oceans. A quasi-stationary center of low pressure was established in the southern zone of the stable western transport, between 55 and 65S. Four-day oscillations were found in the variations of the meriodional pressure gradient. Vortex and gradient vector divergence of atmospheric pressure are calculated, showing the possibility of linking these characteristics to the Antarctic Circumpolar Current.

I-37231

Shirochkov, A.V., Maurits, S.A., **Influence of solar proton flares on changes of antarctic stratospheric temperature regime** [Vliianie solnechnykh protonnykh vspyshek na izmenenie temperaturnogo rezhima v stratosfere Antarktiki], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.405, p.125-131, In Russian. 5 refs.

Data on antarctic stratospheric temperature changes at the 50-200 gPa levels (20-10 km), and the phenomenon of spring build-up for the years 1957-1980, are examined with the following results: a relationship between solar flares and temperature profiles is established; seasonal changes of the vertical temperature gradient can be observed 2-3 weeks ahead of time; the physical mechanism of the phenomenon is proposed, linking it to the redistribution of ozone warm-up of the stratosphere during the solar proton events.

I-37233

Gaffney, D., Casey, T., **Seasonal climate summary southern hemisphere (summer 1986-87): a season of characteristic ENSO anomalies and low planetary wave numbers,** *Australian meteorological magazine,* June 1987 35(2), p.65-77, 11 refs.

An analysis of the Southern Hemisphere circulation for the summer months of Dec. 1986 to Feb. 1987, inclusive, is undertaken. Emphasis is given to the Australian region; an area roughly bounded by Antarctica, the equator, the dateline and 90 deg E. Extratropical anomalies in the atmospheric circulation which developed following the establishment of the tropical El Nino Southern Oscillation (ENSO) related anomalies are discussed, in particular, the ENSO-induced weakening of the mid-latitude westerlies in the Australian region. (Auth.)

I-37234

Callaghan, J., Betts, M.S., **Some cases of westward moving disturbances in the Mawson-Davis area, Antarctica,** *Australian meteorological magazine,* June 1987 35(2), p.79-85, 4 refs.

Westward moving cloudbands have been observed in the area of Antarctica between the Australian stations of Mawson and Davis when there was cyclonic activity along the coast to the east. An examination of several events of this character, which occurred during the summer of 1983/84 and in Jan. 1972, has been carried out. The passage of the cloudbands was accompanied by a barograph trace minimum, with precipitation occurring on the rising barometer following a sharp fall. The vertical structure of one event, when rare inland upper wind data were available, is discussed. A strong middle to upper tropospheric baroclinic zone appeared to develop over the Lambert Glacier-Prince Charles Mountains area as warm air from a cyclone to the east met colder air flowing off the east Antarctic Plateau. (Auth.)

I-37241

Mofsy, S.C., **Interactions between HCl, NOx, and H2O ice in the antarctic stratosphere: implications for ozone,** *Journal of geophysical research,* Mar. 20, 1988 93(D3), p.2442-2450, 42 refs.

Thermodynamic properties of solid phases containing H2O and HCl are examined for conditions expected over Antarctica in winter. It is shown that solid solutions with 0.02-0.035 mole fraction HCl in H2O ice will form in the stratosphere at temperatures between 193 deg and 190 deg K. Crystalline HNO3(centered dot)H2O and/or HNO3(centered dot)3H2O form in the same temperature range. Thus condensation of small quantities of H2O (<1 ppm) leads to nearly complete removal of both HCl and HNO3 from the gas phase. Formation of ice-HCl solid solutions provides a favorable setting for the heterogeneous reaction of HCl with ClNO3, initiating a rapid sequence of reactions that converts solid-phase HCl into gaseous ClNO3 or chlorine oxide radicals. The cycle producing reactive chlorine gases is likely to be completed before particles grow large enough to fall from the stratosphere. Hence precipitation of particles from the polar stratospheric clouds is expected to remove odd nitrogen from the stratosphere efficiently, leaving chlorine gases behind. High concentrations of reactive chlorine oxide radicals are rapidly produced by heterogeneous reactions if the initial concentration of HCl exceeds a critical value, 0.5 times the concentration of NOx before onset of condensation. Production of unreactive ClNO3 and HOCl is favored if HCl levels are lower than this value. The onset of antarctic ozone depletion in the late 1970s may in part reflect growth of HCl levels beyond this threshold. (Auth.)

I-37244
Arias E., L., **NASA's program for antarctic ozone research** [El programa de la NASA de investigación del ozono antártico], *Boletín Antártico Chileno,* July-Dec. 1987 7(2), p.31-42, In Spanish. 6 refs.

The Airborne Antarctic Ozone Experiment, carried out in Aug.-Sep. 1987 from Punta Arenas, is discussed. Participating organizations and individuals are cited, including the author as an observer from INACH. In a review of preliminary results obtained, and their relationship to existing theories, the following are established: evidence that both chemical and meteorological processes are responsible for the ozone hole phenomenon; and the presence of man-produced air pollutants in the polar vortex zone.

I-37249
Frese, W., **Is there a breakup of the Earth's ozone screen** [Zerreisst der Ozon-Schleier der Erde?], *MPG Spiegel,* Mar. 1987 No.1, p.1-4, In German.

For a number of years a hole regularly opens from Sep. through Nov. in the ozone layer over Antarctica. This hole expands year by year and may soon find its counterpart over the North Pole. In recent data there, stratospheric ozone diminished between Jan. and Mar. The chemical processes by which CFCs interact with natural atmospheric processes to deplete the ozone layer are discussed and compared with the observed ozone depletion over Antarctica in recent years.

I-37275
Labitzke, K., **Lower stratosphere over the polar regions in winter and spring: relation between meteorological parameters and total ozone,** *Annales geophysicae,* June 1987 5(3), p.95-102, 20 refs.

To enlarge the discussion on the ozone hole from a meteorological point of view, this paper summarizes climatological features of the lower stratosphere over both polar regions and points to differences. It is suggested that until 1981 most of the observed changes in total ozone over Antarctica can be explained by the different timing of the Final Warmings. Observations for the Arctic during early winter show that the polar vortex became colder and the polar night jet stronger after the volcanic eruptions of Agung, St. Helens and El Chichón. It is suggested that the increased stratospheric aerosol caused this cooling under polar night conditions, and that the same effect led to delayed Final Warmings over Antarctica. Then, a strong and relatively undisturbed polar vortex was available during the whole Oct. and complex chemistry (possibly involving also the increased aerosol) could destroy part of the ozone within the vortex. Therefore, the combined effects of chemistry and dynamics are made responsible for the ozone hole. (Auth. mod.)

I-37285
Wendler, G., Ishikawa, N., Kodama, Y., **Heat balance of the icy slope of Adelie Land, eastern Antarctica,** *Journal of applied meteorology,* Jan. 1988 27(1), p.52-65, 30 refs.

A complete heat budget investigation was carried out in summer at a site in Adelie Land, some 100 km from the edge of the antarctic ice sheet. For an average day, the all wave radiation budget, based on the fluxes toward the surface being positive, was positive for about 11 h, which is a short time considering that the sun was above the horizon between 22 and 24 h a day during the observational period. It is a result of the high albedo, which, on average, was about 83%. Furthermore, with increasing cloudiness, a more positive radiation budget was found, which is in contrast to most studies at lower latitudes. The heat flux in and out of the snow cover was small, and showed a typical sinusoidal diurnal variation. The mean daily values of snow heat flux were negative, as the snow cover was warmed during the observational period. The latent heat flux was negative, on the average, as sublimation took place for most of the time. Deposition was observed only on a few nights. The sensible heat flux was negative around noon, but positive for most of the day, which means that the air above the surface was cooled, an inversion developed, and as the surface is inclined, gravitational flow (katabatic wind) started to occur. While the all-wave radiation balance had its minimum around midnight, the minimum temperature was observed some 3 h later, and the maximum wind speed occurred about 2 additional hours later. (Auth.)

I-37287
Kiehl, J.T., Boville, B.A., Briegleb, B.P., **Response of a general circulation model to a prescribed antarctic ozone hole,** *Nature,* Apr. 7, 1988 332(6164), p.501-504, 15 refs.

Model simulation of the 'ozone hole' observed in austral springtime indicates that the ozone depletion leads to a temperature decrease in the lower antarctic stratosphere of about 5 K in mid-Oct. The temporal evolution of the thermal balance in the control shows that weak upward motion occurs by mid-Sep. and the temperature tendency is dominated by the net radiative heating through late Sep. to Nov. When the ozone hole is imposed, downward motion persists through Sep. to mid-Oct. and the final warming in Nov. is postponed. (Auth.)

I-37293
Ember, L.R., Layman, P.L., Lepkowski, W., Zurer, P.S., **Tending the global commons,** *Chemical and engineering news,* Nov. 24, 1986 64(47), p.14-64.

Ongoing research to determine trends in O3 levels is surveyed; computer modelling of O3 interaction with other atmospheric constituents is discussed. Accepted and proposed theories of global warming, social and economic implications, and gaps in the current atmospheric chemistry database are addressed. Legislative aspects of climate warming are considered, with emphasis on the need to pull together and coordinate research and policy programs scattered among federal agencies.

I-37308
Chelton, D.B., **Time dependent wind fields. Final report, Jan. 27, 1986,** *U. S. National Aeronautics and Space Administration. Contractor report,* Jan. 1986 NASA-CR-179959, 63p., N87-13839, 10 refs. Four appendixes include reprints of articles written by the author and P.J. McCabe and L.L. Fu.

Two tasks were performed: determination of the accuracy of Seasat scatterometer, altimeter, and scanning multichannel microwave radiometer measurements of wind speed; and application of Seasat altimeter measurements of sea level to study the spatial and temporal variability of geostrophic flow in the Antarctic Circumpolar Current. The results of the first task have identified systematic errors in wind speeds estimated by all three satellite sensors. However, in all cases the errors are correctable and corrected wind speeds agree between the three sensors to better than 1m/s in 96-day 2 deg latitude by 6 deg longitude averages. The second task has resulted in development of a new technique for using altimeter sea level measurements to study the temporal variability of large scale sea level variations. Application of the technique to the Antarctic Circumpolar Current yielded new information about the ocean circulation in this region of the ocean that is poorly sampled by conventional ship-based measurements. (Auth.)

I-37312
Breuer, G., **How does the ozone hole form** [Wie entsteht das Ozon-Loch], *Naturwissenschaftliche Rundschau,* Feb. 1988 41(2), p.62-64, In German.

In recent years there has been a dramatic reduction in ozone concentration over Antarctica during the spring (Sep/Oct). Al-

though the controlling processes are not yet completely explained, the participants in a recently held Dahlem conference on atmospheric modification were in unanimous agreement that the leading cause of this condition is the increasing loading of the atmosphere with chlorinated carbohydrates. Joint German-Swedish investigations are being undertaken to determine whether similar developments are occurring over the Arctic region.

I-37324

Cox, R.A., Hayman, G.D., **Stability and photochemistry of dimers of the ClO radical and implications for antarctic ozone depletion,** *Nature,* Apr. 28, 1988 332(6167), p.796-800, 14 refs.

Measurements of the ultraviolet spectrum of the Cl2O2 molecule formed at temperatures in the range 203-300 K by recombination of ClO radicals are reported. The equilibrium constant for the reaction has been determined and the products of photolysis of Cl2O2 at 254 nm investigated. The main photodissociation pathway for Cl2O2 probably produces Cl atoms and chlorine peroxy radicals, as assumed in calculation of the ozone loss by the ClO and Cl2O2 catalytic cycle in the antarctic stratosphere. (Auth.)

I-37329

Rosenfield, J.E., Schoeberl, M.R., Newman, P.A., **Antarctic springtime ozone depletion computed from temperature observation,** *Journal of geophysical research,* Apr. 20, 1988 93(D4), p.3833-3849, 35 refs.

An observationally based, mechanistic dynamical model is used to simulate the decline of total ozone during Sep. and Oct. for the years 1979 through 1986. Vertical velocities derived from observed stratospheric temperature changes and computed radiative heating rates are used to advect an ozone mixing ratio profile during the antarctic spring period. An early Aug. 1982 Showa balloonsonde ozone profile is used to initialize the computations. The model reasonably simulates the Sep. and Oct. changes in total ozone, considering the uncertainties in the observed data and the radiative heating. The simulated decline is found to be very sensitive to the choice of initial ozone profile and to small changes in the radiative heating. The results of this study suggest that the dynamical hypothesis of the antarctic ozone depletion is both quantitatively credible and consistent with the observed temperature changes. (Auth.)

I-37336

Rowland, S., **Can we close the ozone hole,** *Technology review,* Aug./Sep. 1987 90(6), p.50-58.

Concerns about stratospheric ozone, beginning with the general awareness, in the early 1970s, that the industrial release of chlorofluorocarbon (CFC) gases into the atmosphere could damage the Earth's ozone shield, are described. The chemical processes involved are discussed, and the long term consequences examined, including ozone's effect on radiation and the raising of Earth's temperature. Moves toward international regulations to effectively reduce CFC use, such as bans on aerosol propellants, are reviewed. An immediate worldwide freeze, with a 95% phaseout by the early 1990s, is recommended.

I-37371

Weller, M., Leiterer, U., **Experimental data on spectral aerosol optical thickness and its global distribution,** *Contributions to atmospheric physics,* Feb. 1988 61(1), p.1-9, 12 refs.

Because of the importance of aerosols for climatic effect and remote sensing, spectra of aerosol optical thickness are presented and classified for some regions of the world. The size and the time-dependent behavior of these spectra are considered and compared with model data. Qualitative and quantitative estimates are given as far as possible. Data for aerosol optical thickness in Antarctica was gathered from measurements made at Mirnyy, Molodezhnaya, and Vostok. (Auth. mod.)

I-37376

Gao, D., Kawaguchi, S., **Relationship between the increase of temperature and variation of ozone level over Antarctica and the Tibetan Plateau in spring,** *Advances in atmospheric sciences,* Nov. 1986 3(4), p.489-498, 7 refs.

On the basis of ozone and aerological sounding data at Showa Station during 1966-1979, and Lhasa Station during 1979-1983, the processes of temperature increase in spring over the Tibetan Plateau and Antarctica are compared. The relationship between the increase of air temperature and variation of total ozone and ozone partial pressure is analyzed. It is found that: the process of temperature increase over the Tibetan Plateau is quite different from that over Antarctica in spring (this is proof that the heating effects of their ground surface on the atmosphere are very different); sudden increase of total ozone is always associated with sudden warming in the stratosphere over Antarctica, but sudden decrease of total ozone is associated with sudden warming in the troposphere over the Tibetan Plateau in spring; and there is a positive correlation of about 0.85 between the temperature increase and variation of ozone partial pressure in the stratosphere over Antarctica in spring. (Auth.)

I-37382

Molina, L.T., Molina, M.J., **Production of ClO2 from the self-reaction of the ClO radical,** *Journal of physical chemistry,* Jan. 15, 1987 91(2), p.433-436, 21 refs.

The species Cl2O2 has been generated in a gaseous flow system at 220-240 K by reacting Cl atoms with one of 3 different ClO precursors: O3, Cl2O, or OClO. The infrared spectra of the reactive mixture indicate that at least two different dimers are produced: a predominant form with bands centered at 1225 and 1057/cm attributed to ClOOCl, and a second form with a band at 650/cm attributed to ClOClO. The UV spectrum of the predominant form shows a maximum absorption cross section of about 6.5 quintillionths sq cm/molecule around 270 nm, with a wing extending beyond 300 nm. The implications of these results for the chemistry of the stratosphere are discussed. The specific implication is that a cycle consisting of four chemical reactions could play a role in the annual antarctic ozone decline provided that the UV measurements are correct and that the primary ClO2 products are Cl + ClOO. (Auth. mod.)

I-37384

Crowley, T.J., North, G.R., **Abrupt climate change and extinction events in Earth history,** *Science,* May 20, 1988 240(4855), p.996-1002, Numerous refs.

Slowly changing boundary conditions can sometimes cause discontinuous responses in climate models and result in relatively rapid transitions between different climate states. Such terrestrially induced abrupt climate transitions could have contributed to biotic crises in earth history. Ancillary events associated with transitions could disperse unstable climate behavior over a longer but still geologically brief interval and account for the stepwise nature of some extinction events. There is a growing body of theoretical and empirical support for the concept of abrupt climate change, and a comparison of paleoclimate data with the Phanerozoic extinction record indicates that climate and biotic transitions often coincide. However, more stratigraphic information is needed to precisely assess phase relations between the two types of transitions. The climate-life comparison also suggests that, if climate change is significantly contributing to biotic turnover, ecosystems may be more sensitive to forcing during the early stages of evolution from an ice-free to a glaciated state. The analysis suggests that a terrestrially induced climate instability is a viable mechanism for causing rapid environmental change and biotic turnover in earth history, but the relation is not so strong that other sources of variance can be excluded. A connection is made between

paleoclimates and biological extinctions as the Arctic, Antarctic, and Greenland sea ice and glaciations waxed and waned, sometimes over periods of only one or two centuries. (Auth. mod.)

I-37385

Tolbert, M.A., Rossi, M.J., Golden, D.M., **Antarctic ozone depletion chemistry: reactions of N2O5 with H2O and HCl on ice surfaces,** *Science,* May 20, 1988 240(4855), p.1018-1021, 23 refs.

The reactions of dinitrogen pentoxide (N2O5) with H2O and hydrochloric acid (HCl) were studied on ice surfaces in a Knudsen cell flow reactor. The N2O5 reacted on ice at 185 K to form condensed-phase nitric acid (HNO3). This reaction may provide a sink for odd nitrogen (NOx) during the polar winter, a requirement in nearly all models of antarctic ozone depletion. A lower limit to the sticking coefficient, *gamma,* for N2O5 on ice is 0.001. Moreover, N2O5 reacted on HCl-ice surfaces at 185 K, with *gamma* greater than 0.003. This reaction, which produced gaseous nitryl chloride (ClNO2) and condensed-phase HNO3, proceeded until all of the HCl within the ice was depleted. The ClNO2, which did not react or condense on ice at 185 K, can be readily photolyzed in the antarctic spring to form atomic chlorine for catalytic ozone destruction cycles. The other photolysis product, gaseous nitrogen dioxide (NO2), may be important in the partitioning of NOx between gaseous and condensed phases in the antarctic winter. (Auth.)

I-37386

Thrush, B., **Causes of ozone depletion,** *Nature,* Apr. 28, 1988 332(6167), p.784-785, 10 refs.

Research progress is discussed on the problem of the depletion of stratospheric ozone over Antarctica. Various cycles and reactions are shown and techniques used by investigators are noted. It is concluded that the properties of ClOOCl have been successfully measured and the mechanism causing the rapid ozone decay in the antarctic spring could be ClO+ClO+M—Cl2O2+M; Cl2O2+hv—ClOO+Cl; ClOO+M—Cl+O2+M; Cl+O2—ClO+O2.

I-37387

Brasseur, G., Hitchman, M.H., **Stratospheric response to trace gas perturbations: changes in ozone and temperature distributions,** *Science,* Apr. 29, 1988 240(4852), p.634-637, 21 refs.

The stratospheric concentration of trace gases released in the atmosphere as a result of human activities is increasing at a rate of 5 to 8 percent per year in the case of the chlorofluorocarbons (CFCs), 1 percent per year in the case of methane (CH4), and 0.25 percent per year in the case of nitrous oxide (N2O). The amount of carbon dioxide (CO2) is expected to double before the end of the 21st century. The abundance of active chlorine (2 parts per billion by volume in the early 1980s) is expected to reach 6 to 7 parts per billion by volume by 2050. The impact of these increases on stratospheric temperature and ozone was investigated with a two-dimensional numerical model. The model includes interactive radiation, wave and mean flow dynamics, and 40 trace species. An increase in CFCs caused ozone depletion in the model, with the largest losses near the stratopause and, in the vertical mean, at high latitudes. Increased CO2 caused ozone amounts to increase through cooling, with the largest increases again near 45 km and at high latitudes. This CO2-induced poleward increase reduced the CFC-induced poleward decrease. Poleward and downward ozone transport played a major role in determining the latitudinal variation in column ozone changes. The figures included show stratospheric temperature distributions and zonal air motions to 70 km altitude, on a global range extending from 90N to 90S. (Auth. mod.)

I-37421

Sokolov, S.T., **Unfavorable meteorological conditions for flights over East Antarctica during the warm season** [Neblagopriiatnye meteorologicheskie usloviia poletov nad Vostochnoĭ Antarktidoĭ v teploe vremia goda], *Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy,* 1988 Vol.292, p.76-89, In Russian. 23 refs.

Prolonged unfavorable weather conditions, preventing air navigation between Mirnyy and Vostok, and Mirnyy and Molodezhnaya stations during the summer seasons of 1975-1976 and 1976-1977, are described. Cyclones, approaching from a northwesterly direction, lasting 2-3 days, tended to remain on the coast; those coming from the east, lasted 3-5 days and occurred mainly on the glacier slope. Four types of wind regime in the lower and middle troposphere, on the Mirnyy-Vostok route, are identified and described.

I-37422

Parkinson, C.L., **Sea ice as a potential early indicator of climate change,** North American Conference on Preparing for Climate Change, 1st: a Cooperative Approach, Washington, D.C., Oct. 27-29, 1987. Proceedings, Rockville, MD, Government Institutes, Inc., Apr. 1988, p.118-124, 12 refs.

After reviewing the areal extent of sea ice distribution over the course of a year and its high concentration in the Antarctic, the importance of such extensive sea ice cover to the global climate system, and the likelihood that changes in the sea ice cover could prove to be early indicators of climate change, are discussed. The following 3 criteria for a potential early indicator of climate change are listed: the variable should exhibit a large climate signal; it should be readily measurable through routine observations; and it should have low enough natural variability to allow a climate signal to be detected.

I-37438

Yamanaka, M.D., Yamazaki, K., Kanzawa, H., **Studies of middle atmosphere dynamics under the Polar Patrol Balloon (PPB) project: present status and future plans,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.65-74, 29 refs.

Studies of middle atmospheric dynamics under the PPB project have two aspects. On one hand, they are necessary to predict feasibility of PPB flight. Recent studies on global-scale disturbances (planetary waves) over the antarctic stratosphere suggest that the mid-summer (Dec.-Jan.) flight at 30-40 km altitudes has a trajectory with meridional fluctuations around the initial latitude. The mid-winter (June-Aug.) flight in the antarctic stratosphere may be much more circumpolar than that in the Arctic. The spring (Oct.-Nov.) and autumn (Feb.) flights are not adequate for circumpolar observations. (Auth. mod.)

I-37439

Nomura, A., **Dynamics of the mesospheric sodium layer in Antarctica: lidar measurements at Syowa Station, 1985,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.75-83, 19 refs.

Lidar measurements of the mesospheric sodium layer were made on 42 nights from Apr. to Oct. in 1985 during the wintering period of JARE-26 at Showa Station. This work was carried out as a part of the Middle Atmosphere Program (MAP). There were no significant seasonal variations in sodium abundance. Especially, the enhancement of abundance in winter was not observed. These results differ from those obtained at midlatitudes in the Northern Hemisphere. However, it is interesting that the sodium abundance oscil-

lated with a period of about 36 days. As for the nocturnal variations of the sodium layer, the semidiurnal oscillation in the abundance was not detectable, but the wavelike structure due to gravity wave activity was frequently observed in the sodium vertical profile. Moreover, it was found that the sodium layer was perturbed during an auroral breakup event. (Auth.)

I-37440

Tanaka, T., Ogawa, T., Nomura, A., **Neutral wind observations by 50 MHz meteor radar at Syowa Station,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.84-87, 1 ref.

By using a meteor radar, neutral winds were observed at Showa Station. The observed neutral wind velocities show noticeable diurnal and semidiurnal variations. However, the scatter of the data is greater than the amplitudes of these variations. A plausible role of gravity wave in causing this scatter is suggested from a comparison of the meteor winds with the sodium column abundance observed by a laser radar. (Auth.)

I-37441

Kawamoto, H., Ogawa, T., **Negative ions in the lower atmosphere,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.88-98, 26 refs.

The chemical compositions of negative ions in the lower atmosphere (0-30 km altitude) at middle latitudes were investigated with two models, one for the lower stratosphere (15-30 km) and the other for the troposphere (0-15 km). The calculated result shows that the predominant ion species are NO3 neg HNO3H2O in the height range of 0-10 km and NO3 neg (HNO3)2 in 10-30 km, and other main negative species have NO3 neg or HSO4 neg cores. In general, the calculated result agrees with the observed one. A possible role of the ions and aerosols generated by the ion-nucleation mechanism is suggested for the antarctic springtime 'ozone hole' phenomenon. (Auth.)

I-37471

Seshamani, R., Alex, T.K., Jain, Y.K., Kanakaraju, K., **Solar-cyclic variation in radiation from atmospheric carbon dioxide,** *Planetary and space science,* Feb. 1988 36(2), p.177-183, 21 refs.

This paper reports on the variations of the outgoing infrared radiation in the 15 micron band from atmospheric CO2, which is used for horizon sensing by the attitude sensors on the second Indian satellite *Bhaskara* launched in 1979, a similar principle having been adopted in a series of earlier space probes by others over the 16 y period 1964-1980. The radiance values seem to follow the sunspot cycle. (Auth.)

I-37472

Salawitch, R.J., Wofsy, S.C., McElroy, M.B., **Chemistry of OClO in the antarctic stratosphere: implications for bromine,** *Planetary and space science,* Feb. 1988 36(2), p.213-224, Refs. p.222-223.

Observations of OClO over Antarctica in the spring of 1986 are used to place constraints on the abundance of stratospheric bromine. Production of OClO is thought to be due mainly to reaction of ClO with BrO. The observed diurnal variation is consistent with this source only if a fraction of the overall ClO+BrO reaction, between 3.5% and 14%, is assumed to result in production of BrCl. Otherwise the observed diurnal variation of OClO implies an additional source in twilight. The analysis suggests a concentration of stratospheric bromine of 16 pptv, consistent with independent measurements of gaseous bromine which, despite major uncertainty, indicate a range from about 5 to 20 pptv. (Auth.)

I-37475

McElroy, M.B., Salawitch, R.J., Wofsy, S.C., **Chemistry of the antarctic stratosphere,** *Planetary and space science,* Jan. 1988 36(1), p.73-87, Refs. p.86-87.

Interferometric measurements of HCl, ClNO3, HNO3, NO2 and NO obtained over the Antarctic in 1986 are used to constrain models for the chemistry of the atmosphere in the region of the Ozone Hole. It is shown that the abundance of stratospheric HCl was exceptionally low in early Sep. over McMurdo Station and that it recovered below 20 km at a rate consistent with the gas phase reaction of Cl with CH4. The low abundance of HCl is attributed to incorporation of HCl in polar stratospheric clouds (PSCs), and subsequent reaction of HCl with ClNO3 providing a source of chlorine radicals. There is evidence for net loss of HNO3 from the stratosphere. This is attributed to condensation of HNO3 in PSCs followed by precipitation. The abundance of odd nitrogen is suppressed also at high altitudes in the vortex, reflecting in part, it is suggested, the influence of of the reaction of N with NO in the cold summer mesosphere. (Auth. mod.)

I-37495

Rowland, S., **Chlorine chemistry in the antarctic stratosphere,** North American Conference on Preparing for Climate Change, 1st: a Cooperative Approach, Washington, D.C., Oct. 27-29, 1987. Proceedings, Rockville, MD, Government Institutes, Inc., Apr. 1988, p.55-76, 18 refs.

Results from research carried out over Antarctica, which led to the conclusion that the increase of anthropogenic chlorine is an integral factor in the loss of ozone, are briefly reviewed and followed by a detailed description of the following: the chlorine chemistry in the troposphere and stratosphere; and stratospheric chemistry of chlorofluorocarbons; and the antarctic meteorology, with emphasis on the polar vortex and polar stratospheric clouds and the resulting stratospheric ozone depletion. The applicability of the understanding of the special characteristics of antarctic chemistry and meteorology to the Arctic, and to the stratosphere of the temperate and tropical zones, is considered.

I-37504

Kerr, R.A., **Evidence of Arctic ozone destruction,** *Science,* May 27, 1988 240(4856), p.1144-1145.

Reported here are discussions of a Polar Ozone Workshop held in Colorado in May 1988. A team of NOAA atmospheric scientists compared spectrographs of the antarctic atmosphere with some made of the arctic atmosphere at Thule, Greenland. A number of similarities between the two regions are pointed out. A Harvard group also reported elevated levels of chlorine and ozone. The two groups are in disagreement as to the cause of the phenomenon over the Arctic: NOAA opts for heterogeneous chemistry while the Harvard group contemplates the effect of the polar vortex.

I-37510

Singh, O.N., **Hole in the ozone layer—a much discussed phenomenon of this decade,** *Naturwissenschaften,* Apr. 1988 75(4), p.191-193, 28 refs.

The ozone layer in the middle atmosphere, responsible for the very existence of the stratosphere, has been observed to shrink drastically every austral spring over Antarctica. This phenomenon, popularly known as the "hole in the ozone layer," is considered to occur due to the catalytic destruction of ozone by ClOx and BrOx radicals, produced from the decomposition of mostly manmade halocarbons. If the present trend of the deepening of the hole with time persists, effects on global circulation and world climate may be expected for the near future. (Auth.)

I-37514
Japanese Antarctic Research Expedition, **Meteorological data at the Syowa Station in 1986,** Antarctic meteorological data, Vol.27, Tokyo, Japan Meteorological Agency, [1987], 273p.

The tabulated data contained in this volume includes: surface data in the form of monthly summaries, daily summaries, and synoptic data; monthly summaries of upper air data and raw data for twice daily runs; global solar radiation data as monthly summaries and as hourly radiation observations; atmospheric turbidity data with daily summaries of sunphotometer readings and pyrheliometer measurements of daily, monthly, and extreme turbidity; and ozone and long wave radiation data in terms of total ozone, ozone profiles, minute-by-minute l/w radiation and l/w radiation at standard pressure levels.

I-37516
Rayneaud, D., **Climatic and CH4 cycle implications of glacial-interglacial CH4 change in the Vostok ice core,** *Nature,* June 16, 1988 333(6174), p.655-657, 21 refs.

The atmospheric CH4 increase from about 0.7 to 1.68 p.p.m.v. over about the past 300 years, which has been documented from analysis of air trapped in ice cores and from tropospheric measurements, is attributed to anthropogenic modifications of the CH4 cycle. The concern about this increase is due to the radiatively and chemically active nature of CH4. Strong evidence is presented from analysis of the Vostok ice core, that CH4 concentrations increased from 0.34 to 0.62 p.p.m.v. between the end of the penultimate ice age and the following interglacial, about 160-120 kyr BP. This CH4 change may be explained by considering the effect of the climatic change on the CH4 cycle. Its contribution (including chemical feedback) to the global climatic warming is estimated to be about 25% of that due to CO2. (Auth.)

See also:
A-35247 A-35685 A-36212 A-36550 B-35610 B-35615 B-36120
E-34732 E-35018 E-35062 E-35165 E-35211 E-35212 E-35342
E-35479 E-35495 E-35769 E-35776 E-36046 E-36065 E-36217
E-36484 E-36763 E-36990 E-37025 E-37339 E-37483 E-37484
F-34840 F-34900 F-34971 F-35027 F-35079 F-35127 F-35198
F-35244 F-35256 F-35322 F-35395 F-35487 F-35499 F-35500
F-35515 F-35629 F-35682 F-35690 F-35802 F-35828 F-35869
F-36081 F-36082 F-36163 F-36266 F-36289 F-36291 F-36311
F-36406 F-36407 F-36408 F-36409 F-36410 F-36498 F-36499
F-36589 F-36603 F-36671 F-36967 F-36978 F-36986 F-37149
F-37177 F-37270 F-37313 F-37327 F-37328 F-37417 F-37488
G-35111 H-36488 H-36598 J-34713 J-34852 J-35101 J-35220
J-35251 J-35273 J-35348 J-35490 J-35638 J-35705 J-35932
J-36359 J-36581 J-36824 J-36891 J-36902 J-37309 J-37423
K-35961 K-35962 K-35963 K-35964 K-35967 K-35968
K-35969 K-36044 K-36045 K-37442

J. OCEANOGRAPHY

J-34684
Hodell, D.A., Elmstrom, K.M., Kennett, J.P., **Latest Miocene benthic delta O-18 changes, global ice volume, sea level and the 'Messinian salinity crisis',** *Nature,* Apr. 3-9, 1986 320(6061), p.411-414, 35 refs.

Oxygen isotope evidence indicates high but variable delta O-18 values in benthic foraminiferal calcite during the latest Miocene and earliest Pliocene. These high values may represent increases in global ice volume and associated sea-level fall. The delta O-18 record resembles glacial/interglacial cycles, but with only one-third the amplitude of the late Pleistocene signal. This variability may reflect instability in the Antarctic ice sheet, and palaeomagnetic correlation points to an isotopic event coinciding with the isolation and desiccation of the Mediterranean basin during the latest Messinian. (Auth.)

J-34685
Corliss, B.H., Martinson, D.G., Keffer, T., **Late Quaternary deep-ocean circulation,** *Geological Society of America. Bulletin,* Sep. 1986 97(9), p.1106-1121, Refs. p.1120-1121.

A review of paleoceanographic studies dealing with late Quaternary deep-water circulation in the oceans is presented. These studies, which are based on the analysis of deep-sea benthic foraminiferal faunal and geochemical data and sedimentological data, are discussed in light of physical oceanographic conditions in the modern ocean. A re-evaluation of benthic foraminiferal data from North Atlantic and southern ocean piston cores is included and it is suggested that the dominance of *Uvigerina* during glacial intervals reflects increased amounts of organic carbon at the sea floor compared to modern values. The record of Antarctic Bottom Water (AABW) circulation does not show a simple relationship with paleoclimatic oscillations, indicating that changes in oceanographic conditions in the southern ocean had little effect on AABW formation. The AABW record contrasts with the glacial-interglacial cycles of North Atlantic Deep Water (NADW), suggesting no direct link between AABW and NADW circulation. A variety of data suggests that changes in Pacific Deep Water circulation occurred as a result of glacial production of North Pacific deep water or from an increased flux of southern ocean water. (Auth. mod.)

J-34690
Stein, M., **Variability of water masses and currents off the Antarctic Peninsula during SIBEX,** *Archiv für Fischereiwissenschaft,* Apr. 1986 37(Beiheft 1), p.25-50, 12 refs.

Observations on stratification and distribution of water masses in the Weddell-Scotia Confluence area, in the Bransfield Strait and west of the Antarctic Peninsula were performed from RV *Polarstern* in austral spring 1983 and 1984, and by FRV *Walther Herwig* in austral autumn 1985. CTD-profiles of temperature, salinity and sound velocity were carried out along a fixed grid of stations. The measurements reveal the seasonal variation of the main water mass boundary of the area. Based on horizontal distributions of salinity with depth it is shown that the haline signal of the Confluence is maintained down to 2500 m depth. The results obtained from the Bransfield Strait indicate low variance of the thermohaline field in the Bransfield Basins. Geostrophic computations performed along the deep station grid of the Elephant Island Box, in combination with a water mass analysis elucidate the nature of a sub-Warm Deep Water cold water injection. (Auth.)

J-34706
Liebezeit, G., **Residual amino acid fluxes in the upper water column of the Bransfield Strait,** *Oceanologica acta,* Jan. 1985 8(1), p.59-65, 28 refs.

Fluxes of residual amino acids were determined on samples from two drifting sediment traps deployed at 100 m water depth in the Bransfield Strait in Dec. 1980. Differences in the absolute fluxes were related to the sources of sedimenting particulate matter. The relative contributions of amino acids to the total flux and the molar composition were similar for both traps. Comparison with published particulate amino acid fluxes indicates that a distinction must be made between high and low production environments. In the former case, 90% of the primary amino acid production is degraded within the upper 100 m of the water column, whereas in the latter case this zone is extended to approximately 1,000 m. (Auth.)

J-34713
Ciesielski, P.F., Grinstead, G.P., **Pliocene variations in the position of the Antarctic Convergence in the southwest Atlantic,** *Paleoceanography,* June 1986 1(2), p.197-232, Refs. p.228-232.

Middle to late Pliocene (4.1-1.9 Ma) variations in the positions of surface water masses and migrations of the Polar Front in the southwest Atlantic are inferred from a factor analysis of radiolarian assemblages from DSDP site 514. Faunal results suggest that surface water masses underwent progressive cooling as the Polar Front Zone (PFZ) advanced northward during the latest Gilbert to late Gauss chron. This movement northward of cooler surface waters is inferred to be related to the initial growth of sea ice and ice shelves throughout regions of West Antarctica which were deglaciated or unglaciated during the prior warming interval of the Gilbert chron. It is suggested that the permanent change from subantarctic to antarctic surface water mass dominance was linked indirectly to the initial growth of Northern Hemisphere ice and a reduction of sea level. (Auth. mod.)

J-34715
Sarukhanian, E.I., Smirnov, N.P., Zykov, I.D., **Vertical structure of the Antarctic Circumpolar Current in the region between Africa and Antarctica** [Vertikal'naia struktura Antarkticheskogo tsirkumpoliarnogo techeniia v raĭone mezhdu Afrikoĭ i Antarktidoĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.78, p.92-106, In Russian. 18 refs.

The salient features of the vertical structure of the Antarctic Circumpolar Current (ACC) are described, based on the analysis of observations made between Dec. 1978 and Feb. 1979 in regions between Africa and Antarctica. Statistical characteristics of the ACC, based on data obtained at latitudes 47, 48, 51 and 55 S, longitude 20 E, and at depths of 4960, 4150, 3580, and 4250 m, respectively, are tabulated.

J-34733
Mansbridge, J.V., Enting, I.G., **Study of linear inversion schemes for an ocean tracer model,** *Tellus,* Feb. 1986 38B(1), p.11-26, 24 refs.

Several linear biased estimation techniques are applied to a 12-reservoir ocean tracer model. The procedures reduce the sensitivity of the calibration to noise in the data, but the results still indicate a persistent problem with the phosphorus distribution in the Antarctic

region. The airborne fraction of CO2 is found to be insensitive to the changes in circulation associated with different calibration procedures. (Auth.)

J-34751
Ivanov, IU.A., Novitskiĭ, A.G., **On intensification of a frontal eddy embedded in a mean flow with a temperature gradient,** *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics,* 1985 (Pub. June 1986) 21(11), p.924-926, Translated from its Izvestiia. Fizika atmosfery i okeana. 7 refs.

The evolution of a frontal cyclone in the Pacific sector of the Antarctic was investigated during the 30th cruise of the research ship *Dmitri Mendeleev.* Three hydrological surveys made it possible to determine the successive positions of a cold ring and to describe the variation of its thermohaline structure. Analysis of measurements of temperature, salinity, oxygen and other characteristics showed that the cyclonic frontal eddy formed in the vicinity of 60 S as a result of separation of the meander from the southern jet of the Antarctic Circumpolar Current. The frontal cyclone moved northeastward. The intensification of the eddy was caused by a coincidence of horizontal gradients of energy flux with the direction of eddy motion (the mean temperature and salinity gradients coincide with the direction of transfer).

J-34794
Kozlov, V.F., Sokolovskiĭ, M.A., **Meander of a barotropic zonal current crossing a bottom ridge (Periodic regime),** *Oceanology,* 1981 21(6), p.684-687, Translated from Okeanologiia. 14 refs.

DLC GC1.03913

The interaction of a fluctuating barotropic zonal flow with an infinite bottom ridge is examined in the quasi-geostrophic approximation on the beta plane. The solution of the equation for pressure perturbation is constructed by direct asymptotic expansion with respect to the small parameter, proportional to the amplitude of fluctuations of the principal flow. The first approximation of Green's function for easterly and westerly flows is analyzed. The feasibility of employing this model for explaining features in the time variability of the Antarctic Circumpolar Current is discussed. (Auth.)

J-34852
Bagriantsev, N.V., Guretskiĭ, V.V., **Heat transfer in the antarctic zone of the southern ocean,** *Soviet meteorology and hydrology,* 1986 No.1, p.50-56, For Russian original see 15J-33807. 16 refs.

The mechanism of oceanic heat transfer in the Antarctic is discussed; available estimates of heat transfer are analyzed. Heat transfer by average currents in the region of the Weddell Gyre is calculated and found to be formally indistinguishable from zero. It is presumed that heat transfer into the region of the gyre is accomplished by synoptic vortices and possibly by narrow intense currents found outside the limits of resolution of the calculation methods used. (Auth.)

J-34875
Cherniakova, A.M., Borodkin, S.O., **Hydrochemical indicators of frontal cyclonic eddy of the Antarctic Circumpolar Current,** *Oceanology,* 1985 (Pub. April 1986) 25(5), p.574-577, Translated from Okeanologiia. 3 refs.

The synoptic variability of the hydrochemical characteristics in the vicinity of the Antarctic Circumpolar Current (ACC) south of New Zealand is examined. The observations were carried out under the "Antarctic Ocean" program during Dec. 1982-Feb. 1983. It is shown that the investigated frontal cyclonic eddy formed by separation of a meander from the southern branch of the ACC at about 60S, which then moved northeast, transporting an antarctic water mass within its core. (Auth.)

J-34896
Pedley, M., Paren, J.G., Potter, J.R., **Tidal spectrum underneath antarctic ice shelves,** *Journal of geophysical research,* Nov. 15, 1986 91(C11), p.13,001-13,009, 19 refs.

A year-long tidal record has been obtained from beneath the George Vl Ice Shelf. An unusual feature of the record is a significant response in tidal species 3 to 7. These harmonics are practically absent from records further north on the west coast of the Antarctic Peninsula but are present in all tidal height records from George VI Sound. A strong ter-diurnal signal also exists in the tidal currents under the ice shelf. Nonlinearity also occurs in the tidal motion of the Ronne and Ekström Ice Shelves but has not been reported from the Ross Ice Shelf. The tidal dynamics of several antarctic ice shelves have therefore been modified by a region of strong nonlinear response to tidal forcing. An anelastic component in the deformation of the ice at the grounding line is tentatively proposed as the mechanism responsible. The positioning of recording pressure sensors in pairs on the seafloor and at the ice shelf base will allow this hypothesis to be tested and also provide a value for the power dissipated by tidally induced flexure at the grounding line. (Auth.)

J-34926
Ventajas, L., **Distribution and concentration of polynucleate hydrocarbons in the Weddell Sea** [Distribución de la concentración de hidrocarburos polinucleados a lo largo del mar de Weddell], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1986 No.320, 13p., In Spanish with English, German and French summaries. 4 refs.

Concentrations of polynucleate hydrocarbons in surface and depth samples, along the track of icebreaker A.R.A. *Alte. Irizar* in the Weddell Sea, are reported. The samples were obtained at the following depths: at the surface, and at 10, 25, 50, 75, 100, 150 and 200 m. The result of the analyses and a comparative study show that the distribution of the contamination values is not aleatory but follows a sequence. It is also observed that the form of the concentration section curves is similar among the South Weddell Sea stations, while in the Central Weddell Sea it varies. In the two northern stations near the Antarctic Peninsula, high values are found. It is concluded that these could be zones with ocean bottom porosity from which hydrocarbons could arise. (Auth. mod.)

J-35057
Toole, J.M., **Problems of interbasin exchanges and marginal-sea overflows,** *American Meteorological Society. Bulletin,* Feb. 1987 68(2), p.136-140, 1 ref.

A workshop was convened 2-4 Apr. 1986, at the Woods Hole Oceanographic Institution to discuss WOCE plans for addressing the problems of interbasin exchange and marginal-sea outflow. Attendees were asked to address whether the mix of physical, chemical, and numerical measurements discussed previously was suitable on a global basis for studying the exchange and outflow problems. Reflecting the interests of those in attendance, the workshop focused primarily on the Atlantic sector. Presentations were made in three general categories: interbasin exchanges, marginal-sea overflows, and technologies thought valuable to the success of WOCE. A summary of the meeting proceedings and recommendations is given here; the full proceedings will appear as part of United States WOCE Planning Report No.5 A portion of the summary is given over to the southern ocean circulation and water masses around Antarctica, particularly Antarctic Bottom Water. (Auth. mod.)

J-35065
Scripps Institution of Oceanography, **Physical, chemical and *in-situ* CTD (conductivity/temperature/depth) data from the Ajax Expedition in the South Atlantic Ocean,** La Jolla, 1985, 275p., ADA-166 146, 11 refs.

This data report presents hydrographic and CTD data collected aboard the RV *Knorr* on Ajax Expedition Leg 1, Abidjan, Ivory Coast to Cape Town, South Africa, and on Leg II, Cape Town to Punta Arenas, Chile. The expedition objectives were to provide data on the general circulation of the South Atlantic, Weddell Gyre and the Scotia Sea. A line of hydrographic stations, with sampling from the surface to the bottom on most stations, was occupied along the Greenwich meridian from the coast of Africa at 5 N to the antarctic ice edge at 69 S, and from there across the Scotia Ridge and through the Scotia Sea. In addition to the hydrographic measurements of temperature, salinity, oxygen and nutrients given in this report, water samples were also collected for analyses of other tracers such as freons 11 and 12, tritium and helium-3.

J-35101

Seidov, D.G., Enikeev, V.Kh., **Modelling of ocean circulation and paleocirculation** [Modelirovanie tsirkuliatsii i paleotsirkuliatsii okeana], Moscow, Nauka, 1986, 95p., In Russian. 112 refs.

The book deals with oceans of the Southern Hemisphere. The first of 3 chapters reviews meteorological features of the Southern Hemisphere and the hydrology and currents of its oceans. The second ch. deals with the numerical modelling of ocean climate, and gives a short analysis of some diagnostic and prognostic numerical experiments on estimated large-scale currents. A numerical model of global water circulation is described in detail in ch. 3, with computation of contemporary currents and reconstruction of their geological history. Presented are also results of studies on sample models of the Southern Hemisphere oceans, and an analysis of contemporary and paleo-circulation, based on hydrological findings and paleo-reconstruction.

J-35112

Venkatesan, M.I., Ruth, E., Kaplan, I.R., **Coprostanols in antarctic marine sediments: a biomarker for marine mammals and not human pollution,** *Marine pollution bulletin,* Dec. 1986 17(12), p.554-557, 21 refs.

The first analysis of sterols in antarctic marine sediment cores (Bransfield Strait and McMurdo Sound) is reported here. The isolated sterols in the sediments from Bransfield Strait are comprised mainly of dinosterol, coprostanol and epicoprostanol and trace amounts of cholesterol. The sediment cores of McMurdo Sound also contain small quantities of coprostanols in addition to large amounts of marine sterols. Dinosterol is a known dinoflagellate chemical marker, whereas coprostanols are currently being used as tracers for sewage contamination. However, sterol composition in antarctic sediments is expected to be atypical of sewage input and probably different from those of temperate and tropical zones. The coprostanols must therefore arise from the feces of marine mammals, most probably whales which use the region for feeding and spawning. Based on the results of this study, caution should be exercised in the use of coprostanol to estimate the amount of sewage-derived organic matter transported away from impacted coastal areas. (Auth.)

J-35153

Harada, K., Tsunogai, S., **Fluxes of Th-234, Po-210 and Pb-210 determined by sediment trap experiments in pelagic oceans,** *Oceanographical Society of Japan. Journal,* June 1986 42(3), p.192-200, Refs. p.199-200.

Sediment trap experiments were carried out in the eastern Pacific Ocean and the Antarctic Ocean, which have very different biological productivities. The natural radionuclides, Th-234, Po-210 and Pb-210 were used as tracers of reactive metals. Larger particulate fluxes of these radionuclides were found in the seas where total mass fluxes were larger, although the concentrations of these radionuclides in the settling particles were somewhat smaller. The concentrations of Th-234 in the settling particles varied widely and irregularly with depth, whereas the concentrations of Po-210 and Pb-210 in the settling particles steadily increased with increasing water depth. These results suggest that, when the particles sink through the water column, these radionuclides are being absorbed by settling particles in the order Th-234 > Po210 > Pb-210, and that there must be a horizontal flow carrying these reactive metals from the oligotrophic ocean to the biologically productive ocean where the metals are removed by settling particles even in deep water. (Auth. mod.)

J-35217

Matveev, V.I., **Hydrochemical conditions of the Ross Sea** [Nekotorye osobennosti gidrokhimicheskikh usloviĭ moria Rossa], *Dal'nevostochnyĭ regional'nyĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.114, p.26-33, In Russian. 14 refs.

Based on oceanographic data obtained during 1979-1981 expeditions, and review of earlier work, it is concluded that the principal factors contributing to hydrochemical conditions of the Ross Sea are found in waters of the Antarctic Circumpolar Current. Illustrations showing the distribution of dissolved oxygen and biogenic matter are presented and discussed, the point being made that conditions conducive to optimum levels of primary productivity in the Ross Sea are to be found in its central portion.

J-35218

Zhigalov, I.A., **Seasonal and interannual variability of antarctic currents at 163E** [O vnutrisezonnoĭ i mezhgodovoĭ izmenchivosti techeniĭ Antarktiki na razreze po 163 v.d.], *Dal'nevostochnyĭ regional'nyĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1986 Vol.114, p.37-43, In Russian. 14 refs.

Spatial and temporal variability of currents in the western portion of the Pacific Ocean's antarctic sector is discussed. The water transport in the 0-1000 m layer, and maximum velocity of the southern branch of the Antarctic Circumpolar Current at 163 deg E, is shown for the period 1973-1981. A table is presented, showing: time of year; latitudinal boundaries of layers, with a range between 57 and 67 deg S; water transport of the southern branch of the Antarctic Circumpolar Current in mill. cu m/s, ranging between 7.8 and 15.9; and maximum velocities of the easterly currents in cm/s, ranging between 5.4 and 17.2

J-35220

Fontugne, M., comp, Fiala, M., comp, **MD38/Apsara 2—Antiprod 3 on board the *Marion Dufresne* Jan. 16-Feb. 22, 1984** [MD38/Apsara II—Antiprod III à bord du *Marion Dufresne* 16 janvier-22 février 1984], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, 345p., In French. Refs. passim. For individual papers see B-35225 through B-35230, E-35231, J-35221 through J-35224, and L-35232.

This volume is a collection of individual reports of research carried out in the Indian Ocean on board the *Marion Dufresne* in the austral summer of 1984. The introductory paper outlines the objectives of the 2 programs, Apsara 2 and Antiprod 3, shows schedules and team composition, and offers tables with meteorological, hydrological and biological data obtained during the cruise. The next 9 papers deal with the physical and chemical characteristics of the water masses, analysis of nutrient concentrations of surface waters, primary productivity measurements, studies of phytoplankton communities, and seabird distribution between the subantarctic islands and the antarctic continent. The last 2 papers offer results of geological, biostratigraphic and geophysical studies carried out on cores obtained in the region investigated.

J-35221
Fiala, M., Fontugne, M., **Biology, chemistry and sedimentology of the Kerguelen Plateau during Apsara 2 and Antiprod 3, Jan.-Feb. 1984** [Présentation de la campagne Apsara II-Antiprod III (Janv-Fevr 1984). Caractéristiques biologiques, chimiques et sédimentologiques du secteur Indien de l'Océan Austral (Plateau de Kerguelen)], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.5-53, Refs. p.19-20., In French with English summary.

In this introduction the general characteristics of Apsara 2 and Antiprod 3 cruise are presented, outlining the scientific purposes, the schedule and the composition of the research teams. Tables with day-by-day meteorological, oceanographic and biological data, obtained in the Indian Ocean between Jan. 18 and Feb. 1984 from 60 different stations, are included.

J-35222
Tréguer, P., **Physical and chemical properties of the Indian Ocean water masses south of the polar front** [Caractéristiques physiques et chimiques des masses d'eaux du secteur Indien de l'Océan Austral au sud du front polaire (Mer d'Amery) (Campagne Apsara II—Antiprod III, 1984)], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.54-74, 15 refs., In French with English summary.

Physical and chemical characteristics of water masses are determined during Apsara 2 and Antiprod 3 (1984). Compared with previous data (1977, 1980), a constancy of the north Indian component of the Warm Deep Water (WDW), and a relatively large variability of the north Atlantic WDW component, is demonstrated. Dissolved Organic Nitrogen (DON) shows minimum concentrations in WDW. Urea is only 2 to 4% of DON. By means of physical and chemical characteristics deep (WDW) and bottom waters (AABW) are identified: the north Indian component of WDW reaches 66 S; a penetration of South Indian Antarctic Bottom Water in the Weddell-Enderby is demonstrated. The input of AADW from Prydz Bay is undetectable. In superficial water masses, a classical decreasing ratio silicate/nitrate is observed going from the Antarctic Divergence to the Polar Front. Maximum values of ammonium occur near the continent. (Auth.)

J-35223
Appriou, P., Bordin, G., Tréguer, P., Le Jehan, S., **Copper, manganese and cadmium in the antarctic sector of the Indian Ocean** [Cuivre, manganèse et cadmium dans le secteur Indien de l'Océan Antarcticque (Campagne Apsara II—Antiprod III, 1984)], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.75-86, 3 refs., In French with English summary.

During the cruise Apsara 2 and Antiprod 3 the values for concentrations of copper, cadmium and manganese in the Indian sector of the antarctic ocean between latitudes 51 deg 00 S and 66 deg 58 S, have been determined. Profiles and surface distributions of these metals are similar to those obtained in other oceans, and show coastal influences by increased concentrations in surface waters. Relationships between metals and other parameters are examined.

J-35224
Simon, V., Sarano, F., **Nutrient salt concentrations of surface water in the Indian Ocean** [Concentrations en sels nutritifs de l'eau de surface dans le secteur Indien de l'Océan Austral (Campagne Apsara II—Antiprod III, 1984)], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.87-103, 9 refs., In French with English summary.

A continuous analysis of the nutrient concentrations of surface water in the Indian sector of the southern ocean, carried out along several transects between 40 S and 67 S (Apsara 2 and Antiprod 3 cruise, 1984), shows a wide small-scale variability and, in early summer, close connection between nutrients and hydrological structure. In this area, deep circulation is strongly disturbed by the presence of the Crozet and Kerguelen-Heard Plateaux and, as a result, hydrological surface structure accurately reflects bottom features. The most remarkable result shown by continuous analysis is that nutrients evolve differently depending on the zone considered. In the convergence area, only nitrate concentrations sharply increase at the Subtropical convergence, whereas silicate concentrations do not increase till the Antarctic Convergence is reached. In the antarctic zone, a marked relationship between the two nutrients was observed. In late summer, effects of biological activity are added to those of physical processes, resulting in a greater decrease of silicate than nitrate concentrations in Surface Antarctic Water. (Auth.)

J-35246
Lutjeharms, J.R.E., McQuaid, L.H., **Changes in the structure of thermal ocean fronts south of Africa over a three-month period,** *South African journal of science,* Sep. 1986 82(9), p.470-476, In English with Afrikaans summary. 32 refs.

The results of measurements on the thermal structure of the upper ocean layers between South Africa and Antarctica are presented. The location of five frontal systems in the area and their temporal evolution are shown, based on four cruise lines carried out by two vessels over a period of two months during the summer of 1979-80. The growth of step-like frontal morphologies with the onset of summer is confirmed. Results suggest that the changeover in the thermal structure from a winter to a fully developed summer regime may occur over a relatively short period. (Auth.)

J-35251
Kellogg, T.B., Kellogg, D.E., **Glacial-interglacial changes in Antarctic Bottom Water,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.501-503, 43 refs.

A number of papers presented at the Workshop on Neogene Glacial History of the Antarctic Cryosphere deal directly or indirectly with the formation and flow of deep and bottom water masses derived from Antarctic continental shelves. In all cases, it was assumed that Antarctic Bottom Water (AABW) forms on Antarctic continental shelves, presumably by the well-known processes of salt-rejection during sea-ice formation with subsequent density increase caused by the cabbeling instability: classic AABW. This note reviews the recent literature on processes of deep and bottom water formation and describes some ramifications for palaeo-oceanographic and palaeoclimatic reconstructions. (Auth.)

J-35254
Mabin, M.C.G., **Ross Sea section of the antarctic ice sheet at 18 000 yr B.P.: evidence from the Holocene sea-level changes along the Victoria Land coast,** *South African journal of science,* Sep. 1986 82(9), Palaeoclimate and Evolution III, p.506-508, 9 refs.

Three different approaches can be used to reconstruct Pleistocene ice sheets: glacial geology, glaciological theory, and glacial isostasy. In this paper preliminary results are reported of a survey of raised beaches in Victoria Land, and evidence is discussed for relative sea-level change and glacial isostasy of this part of the antarctic ice sheets. (Auth. mod.)

J-35271

Kelly J., R., Blanco G., J.L., **Hydrography of Bransfield Strait during SIBEX-2, Chile, summer 1985** [Hidrografía del estrecho Bransfield durante el verano austral 1985 (SIBEX-Fase II, Chile)], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.7-30, 16 refs., In Spanish with English summary.

The SIBEX-2 cruise was carried out on the *M/N Capitan Luis Alcazar,* between Jan. 24 and Feb. 12, 1985, in waters of the Bransfield Strait and adjacent zones. Temperature, salinity and dissolved oxygen data were obtained in 31 oceanographic stations down to a maximum depth of 700 m. With this information an analysis was made of the properties distribution, water masses, geopotential difference and stability of the upper layer. The results presented similar characteristics to those obtained during SIBEX-1, although temperature and salinity were slightly higher. Some characteristics which could be considered permanent during this season were identified. These are the saline front located south of Trinity I., the meander present with more or less intensity south of Deception I., the presence of the Weddell-Scotia Confluence south of Piloto Pardo Is. and the composition of the water bodies in the Bransfield Strait. (Auth.)

J-35272

Silva S., N., **Chemical oceanography of the Bransfield Strait waters: micronutrient contents (SIBEX-2, Chile)** [Oceanografía química de las aguas del estrecho Bransfield: Compuestos micronutrientes (SIBEX-Fase II, Chile)], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.31-61, 18 refs., In Spanish with English summary.

Water samples, collected in the upper 700 m of the Bransfield Strait and vicinity in the austral summer of 1985, were analyzed for their micronutrient content (phosphate, silicate and nitrate). Results, compared with concentrations found in previous years, were found to be statistically different from the summer of 1981 but similar to those observed in 1984. Two water masses are identified in this area: Bellingshausen Antarctic Surface Water and Weddell Sea Surface water; and 4 water bodies: Bransfield Strait Surface Water, Gerlache Strait Surface Water, Antarctic Peninsula Continental Shelf Surface Water and Bransfield Strait Deep Water. Micronutrient contents for each of these bodies of water are given in relation to each other. Six different temperature-salinity (T-S) diagrams are identified. A zonation map was prepared to show where these structures were present. In relation to the temperature-micronutrient diagrams (T-Phosphate, T-Nitrate and T-Silicate), they were used as a complement to the T-S diagrams in the water mass structure characterization of the area. (Auth. mod.)

J-35273

Rojas R., R., **Thermal structure and heat flux in the Bransfield Strait during SIBEX-2, 1985** [Estructura térmica y flujos de calor en el estrecho Bransfield durante SIBEX 1985 (SIBEX-Fase II-Chile)], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.63-87, 14 refs., In Spanish with English summary.

A cruise named SIBEX-2 performing oceanographic observations in the Bransfield Strait between Jan. 20 and Feb. 15, 1985, and continuing the study of the thermal structure of the Bransfield Strait initiated during SIBEX-1 is described. A total of 57 XBT and salinity samples were obtained. Using the meteorological data of the area a heat flux budget was made. The temperature distribution pattern of SIBEX-1 is quite similar to that of SIBEX-2 though higher temperatures were found north of the strait during the last cruise. Except for the 50 m depth level, the temperatures at any other compared depth between the two cruises were statistically not different (99% confidence). From the surface temperature, salinity and density distributions, it was not possible to determine the formation of the meander between Deception and Bravante Is. nor the Weddell Scotia Confluence south of Elephant and Clarence islands. The cyclonic eddy located south of King George I. is suggested by the surface isopicnal distribution. Regarding the heat flux budget in the Bransfield Strait, an atmosphere to ocean transfer of 222 (cal/sq cm/day) was obtained which reasonably agrees with heat flux estimates for the same period for the southern ocean. A simple box model for the area states that the rate of heat flux to the waters of the strait between atmosphere and advective processes is 2:1. (Auth. mod.)

J-35337

Lawver, L.A., Vedova, B.D., Von Herzen, R.P., **Heat-flow measurements in the Jane Basin, a back-arc basin, northern Weddell Sea,** *Antarctic journal of the United States,* 1985 20(5), p.87-88, 1 ref.

R/V Discovery, the British oceanographic research ship, undertook a cruise that explored the Antarctic Peninsula, the Weddell Sea, and the South Sandwich Trench regions of the southern oceans. Thirty-seven separate measurements were made of heat flow during five stations. Twenty-three of the penetrations were made using a 6-m barrel with seven outrigger thermistors spaced 65 to 90 cm apart. The remaining 14 penetrations were taken using 3.5-m probe. Two lower sections of the 6-m probe were lost in attempts to penetrate very hard sandy sediments. Stations in the Jane Basin, with the exception of the one penetration nearest the South Orkney block, all showed full penetration with virtually straight thermal gradients. The thermal gradients that had changes in slope, could generally be correlated with changes in the measured *in situ* thermal conductivity. Two hundred fifteen *in situ* thermal conductivities and 74 needle probe conductivities were measured in the Jane Basin area. In general, the *in situ* thermal conductivity agreed to within a few percent with the measured needle-probe thermal conductivity.

J-35343

Dunbar, R.B., MacPherson, A.J., Wefer, G., **Water-column particulate flux and seafloor deposits in the Bransfield Strait and southern Ross Sea, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.98-100, 15 refs.

A recent proliferation of sediment trap experiments and surface sediment collection allows development of models for sedimentation on the antarctic shelf. Shelf surface sediments have biogenic silica contents ranging up to 45 weight % and organic carbon contents ranging up to 2.3 weight %. Organic C to opal ratios are low due to more efficient oxidation of organic C relative to silica dissolution. Two potential "end-member" Antarctic depositional environments are examined in detail. In the southern Ross Sea, modern terrigenous input appears negligible, and biogenic particles sink as slowly settling aggregates of undigested opaline debris, resulting in sediments with high opal and low organic C contents. In the Bransfield Strait, zooplankton pellets rapidly transport freshly produced biogenic phases to the seafloor. Organic carbon preservation is enhanced, but dilution of both opal and organic C with an increased supply of terrigenous material occurs both in the water column and at the seafloor.

J-35344

Leventer, A.R., Dunbar, R.B., **Suspended particulate matter in antarctic coastal waters,** *Antarctic journal of the United States,* 1985 20(5), p.100-103, 14 refs.

Suspended particulate matter was collected from McMurdo Sound, the Antarctic Peninsula region, and adjacent to the Ross Ice

Shelf. Concentrations of suspended material range between 50-3000 microg/l, two or more orders of magnitude lower than concentrations measured in glaciomarine environments subject to large influxes of sediment laden meltwater. Surface water particulate concentrations are influenced greatly by primary production within the photic zone. Low mid water concentrations observed in the Antarctic Peninsula (100-200 microg/l) may reflect efficient grazing, pelletization, and subsequent shorter particle residence times as compared to the Ross Sea and McMurdo Sound. Near bottom nepheloid layers are observed in several of the profiles from the Ross Sea and northwestern Weddell Sea.

J-35346

Foster, T.D., Yutian, M., Eckert, E.G., **Physical oceanography during the Wilkes Land Expedition 1985,** *Antarctic journal of the United States,* 1985 20(5), p.104-105, 2 refs.

It was the purpose of the Expedition to investigate the possibility that deep water forms between 147 and 162 deg E. To that end hydrographic sections were made orthogonal to the general bathymetry from the open ocean up onto the continental shelf to delineate the temperature and salinity structure of the ocean through a complete vertical profile at each station. Preliminary results are indicated.

J-35347

Michel, R.L., Keir, R.S., Schroeder, R.A., **Chemical oceanography during the 1985 Wilkes Land Expedition,** *Antarctic journal of the United States,* 1985 20(5), p.105-107, 12 refs.

Seven hydrographic sections were sampled for chemical content. Freons, acid balance, alkalinity, and nutrients were gathered in all sections. More extensive samplings were made in sections 3 and 7 where samples for tritium, helium-3, carbon-14, calcium, and stable isotopes were also collected. Preliminary data for the sections across the shelf break near Wilkes Land show high freon concentrations along the continental slope.

J-35348

Hughes, P., Krissek, L.A., **Modern sediments of the Terra Nova Bay polynya, Ross Sea, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.107-108, 6 refs.

The primary process that makes the area of the Terra Nova Bay polynya different from adjacent ice-covered areas is wind blown materials from exposed rocks on the shore. Katabatic winds blow steadily at 30k here, with much greater velocities during storms. The same winds blow icebergs quickly out to sea, accounting for the decreased deposition of glacially transported materials. Other sediment components are similar to those found in ice-covered areas.

J-35349

Dunbar, R.B., Leventer, A.R., Marty, R.C., **Vertical sediment flux beneath annual sea ice, McMurdo Sound, Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.109-111, 13 refs.

A variety of sources and transport pathways supplies sediments to the region: land generated material is transported by ice rafting and by icebergs, while biogenetic material accumulates rapidly, borne by the water currents in the Sound. Forty-five sediment traps were deployed at 14 sites in the Sound and hauled out for examination at two-week intervals. Locations of the traps and sample results are presented.

J-35350

Pillsbury, R.D., Jacobs, S.S., **Ross Sea oceanography, 1985,** *Antarctic journal of the United States,* 1985 20(5), p.112-113, 5 refs.

Field studies of ocean/ice interactions continued on two cruises on *Polar Star* from the end of Jan. to the first week in Feb. 1985. Lines of XBTs were cast between McMurdo Station and Terra Nova Bay and between MCM and Mooring I near the eastern end of Ross Ice Shelf. Readings were taken at 30 minute intervals and the Ross Ice Shelf barrier position was logged every 15 minutes. Reduction, analysis and reporting of the data is underway at Oregon State U. and Lamont-Doherty Geological Lab.

J-35352

Chen, C.-T.A., Rodman, M.R., **Use of acid-balance values to trace water-mass in the Weddell Sea,** *Antarctic journal of the United States,* 1985 20(5), p.115-117, 17 refs.

Acid balance data (pH) were obtained in the late winter of 1981 as a part of the US-USSR Weddell Polynya Expedition. Potential temperature and density are paramcters showing distinct regimes in acidity. These discontinuities are discussed in terms of how antarctic water masses are modified as they move in and out of the various basins near Antarctica.

J-35354

Whitworth, T., III, **Atlantic long lines, leg II, Cape Town to Punta Arenas,** *Antarctic journal of the United States,* 1985 20(5), p.119-120, 3 refs.

The Atlantic long lines experiment was designed to provide a nearly synoptic section between North Africa and Antarctica along the Greenwich Meridian. The first part of the cruise track of Ajax II was from 45 S to the edge of the pack ice off Antarctica at 69.3 S. About 3,000 individual water samples were collected and analyzed for salinity, oxygen, silicate, nitrate, nitrite, and phosphate concentrations. The rest of leg II was devoted to several specialized studies in the Weddell and Scotia Seas. Analysis of the preliminary data reveals that the subantarctic and Polar Fronts are nearly as narrow in the open ocean along the Greenwich Meridian as they are in the restricted confines of Drake Passage. Evidence was found of an eastward extension of the Weddell-Scotia Confluence to 1 E, confirming an earlier observation. Tracer distributions indicate that Weddell Sea bottom water circulates cyclonically around the Weddell Gyre as a bottom boundary current. The section across the South Sandwich Trench shows that cold, fresh Weddell Sea deep water flows to the north along the western flank of the trench. On the eastern edge of the trench, the deep flow is to the south. North of Elephant Island, there is a narrow band of cold, fresh, highly oxygenated water between 300 and 1,000 m. The water characteristics imply a Weddell Sea origin, and the westward flow may be part of a circumpolar Polar Slope Current.

J-35357

Biggs, D.C., Guffy, J.D., Murphy, D.J., Amos, A.F., **Nutrients and ice-shelf water along the barrier edge of the Ross Ice Shelf,** *Antarctic journal of the United States,* 1985 20(5), p.125, 5 refs.

Surface sampling every 15 minutes along transects McMurdo to Terra Nova Bay and the entire length of the Ross Ice Shelf allowed 5-km resolution of surface nutrient and chlorophyll fields. Bottle sampling at 4 to 5 depths in the upper 200 m at conductivity-temperature-depth stations provided vertical detail. As in previous field seasons, these bottle cast profiles generally targeted high concentrations of ammonium subsurface, at depths of 100 to 150 m. Details of the sampling program are outlined.

J-35392

Ivchenko, V.O., Klepikov, A.V., **Quasigeostrophic model of circulation in the southern ocean with parameterization of synoptic eddies,** *Akademiia nauk SSSR. Doklady. Earth science sections,* Mar.-Apr. 1985 281(2), p.196-198, 15 refs. For Russian original see 15J-33957.

Forecast models of large-scale ocean circulation require correct parametrization of synoptic-scale perturbations. This parametrization is particularly important in the case of zonal currents, such as the Antarctic Circumpolar Current (West Wind Drift, ACC). Since the Sverdrup relation does not in general apply to zonal currents, divergence of the eddy (turbulent) flow of potential vorticity must be significant in the balance of the vertical component of the curl of the wind shear stress. A set of equations is derived confirming that the Sverdrup balance does not hold in the main zonal stream. (Auth.)

J-35394

Carmack, E.C., **Circulation and mixing in ice-covered waters,** NATO Advanced Study Institute on Air-Sea Interaction, Acquafredda di Maratea, Italy, Sep. 28-Oct. 10, 1981. Proceedings. Geophysics of sea ice. Edited by N. Untersteiner. NATO ASI series, Series B: Physics, Vol.146, New York, Plenum Press, 1986, p.641-712, Refs. p.701-712.

Connections between physical oceanography and ice cover: namely, how does water circulation influence ice state, and what effects do ice growth and decay have on water movement are discussed. A review of the hydrography of the Arctic Ocean, Greenland Sea and southern ocean is given. Heat and mass transfer mechanisms which are either caused or affected by the presence of ice are reviewed.

J-35431

Nowlin, W.D., Jr., Klinck, J.M., **Physics of the Antarctic Circumpolar Current,** *Reviews of geophysics,* Aug. 1986 24(3), p.469-491, Refs. p.489-491.

A region of transition of surface water characteristics from subantarctic to antarctic and an associated eastward flowing Antarctic Circumpolar Current (ACC) have long been recognized to exist as a band around Antarctica. In this review the authors summarize the most important observational and theoretical findings of the past decade regarding the ACC, identify gaps in what is known and recommend studies to address these. The nature of the meridional zonation of the ACC is only now being revealed. The ACC seems to exist as multiple narrow jets imbedded in, or associated with, density fronts (the Subantarctic and Polar fronts) which appear to be circumpolar in extent. These fronts meander, and current rings form from them; lateral frontal shifts of as much as 100 km in 10 days have been observed. Literature is reviewed of the volume transport of the ACC, the meridional exchange of heat across it, the eddy variability, and other observations from ships, drifters and satellites. (Auth. mod.)

J-35439

Whitehead, J.A., **On the ratio of mixing coefficients of heat and salt of Antarctic Bottom Water in the North Atlantic,** *Journal of geophysical research,* Mar. 15, 1987 92(C3), p.2981-2984, 2 refs.

Values of vertical eddy salt diffusivity and heat diffusivity for Antarctic Bottom Water were estimated by Whitehead and Worthington (1982) from both current meter results and geostrophic calculations. The ratios of the diffusivities have one impossible value of 0.858 for water colder than 1.1 C potential temperature for the geostrophic results. This could be evidence against the geostrophic results. However, a small interpolation error in their Tables 5 and 6 was uncovered. The corrected ratio is 1.01, which is possible, although very close to 1, and one other ratio is 0.98. Thus geostrophic calculations cannot be ruled out, but they lead to ratios very close to 1. (Auth.)

J-35441

Sharma, G.S., Mathew, B., **Hydrography and circulation off the Antarctica in the Indian Ocean region,** *Indian Academy of Sciences. Proceedings. Earth and planetary sciences,* Mar. 1985 94(1), p.13-27, Refs. p.27.

The hydrography and circulation patterns off Antarctica in the Indian Ocean region are studied using vertical sections of temperature, salinity and oxyty along 20 E, 77 E and 90 E, and the dynamic topography of the sea surface with reference to 1000 db. Based on the oceanographic characteristics, the whole region under study can be divided into three zones, the extreme ends being characterized by the frontal structure. The dicothermal layer is conspicuous during summer south of 50 S. The surface flow around Antarctica is mainly zonal. The East Wind Drift, found as a narrow westward flow near Antarctica, is observed at a lower latitude in the eastern Indian Ocean where the land extends northward. Contrary to expectation, there is evidence of a westward flowing surface current at about 35 S, between 45 E and 65 E. (Auth.)

J-35451

Gersonde, R., Wefer, G., **Sedimentation of biogenic siliceous particles in antarctic waters from the Atlantic sector,** *Marine micropaleontology,* Mar. 1987 11(4), p.311-332, 35 refs.

Sediment traps were deployed in the Drake Passage, Bransfield Strait and west of South Orkney Islands (Powell Basin) during Dec. 1980/Jan. 1981, Dec. 1983, and between Mar. and Dec. 1983, respectively. Most of the trapped material is biogenic opal except in the lower half of the water column in Bransfield Strait where large amounts of resuspended aluminosilicates and quartz grains were present. Frustules and skeletons of siliceous microorganisms (diatoms, silicoflagellates, radiolarians, chrysophycean cysts), fragments and moults of crustaceans and tests of foraminifera were found. Quantitatively diatoms are the dominant constituent of the trapped biogenic material. Alteration of diatom assemblages in the water column is due to mechanical breakdown by grazing zooplankton. It mainly affects large frustules in the uppermost part of the water column. Dissolution of frustules occurs mostly at the sediment/water interface and leads to the enrichment of strongly silicified valves. At the Bransfield Strait site a large part of biogenic opal was incorporated into fecal pellets of krill and copepods. The bulk of pellet content consists of fragmented diatom frustules. Most intact valves found in the sediments have settled through the water column by means other than fecal pellet transport. (Auth.)

J-35452

Mead, G.A., Kennett, J.P., **Distribution of recent benthic foraminifera in the polar front region southwest Atlantic,** *Marine micropaleontology,* Mar. 1987 11(4), p.343-360, 50 refs.

Twenty-five core-top samples from the Maurice Ewing Bank (MEB) and Islas Orcadas Rise (IOR) were examined to determine the distribution of benthic foraminifera in the vicinity of the Polar Front in the southwest Atlantic Ocean. The Polar Front has a subsurface expression that affects the areal and depth distribution of benthic foraminifera in this region. Three faunal assemblages were identified by Q-mode factor analysis. These assemblages are described by preferred depths, dominant species, potential temperatures, salinities, potential densities, and locations. Shallowest occurring assemblage is within the core of the Lower Circumpolar Deep Water (LCDW), while the other two assemblages occur within transition zones between the LCDW and Weddell Sea Deep Water (WSDW). The difference in the benthic foraminiferal assemblages at similar depths on the Islas Orcadas Rise and the Maurice Ewing Bank is the result of different water-mass regimes separated by the Polar Front. (Auth. mod.)

J-35460
Guretskiĭ, V.V., **Study of large-scale circulation in the Atlantic sector of the southern ocean,** *Oceanology,* Oct. 1986 26(2), p.131-135, Translated from Okeanologiia. 22 refs.

Diagnostic calculations of the large-scale circulation of the Atlantic sector of the southern ocean are compared with the observed positions of frontal zones and buoy and iceberg tracks. A close relationship is observed between the fronts and the currents. Satisfactory agreement is obtained for the model and observed drift tracks. The calculations reveal two streams in the Antarctic Circumpolar Current. On the average the relative error along the vertical for the current speed due to errors in the density of the water may reach 30%. (Auth.)

J-35461
Tambiev, S.B., **Authigenic sediment formation in the oceans,** *Oceanology,* Oct. 1986 26(2), p.164-170, Translated from Okeanologiia. 35 refs.

A large body of data is used to discuss the formation of suspended organic aggregates in sea water. During passage of air bubbles and formation of aggregates the pH of the sea water decreases and its alkalinity rises. The concentrations of dissolved Si and P in sea water also fall as a rule. The aggregates are films, clumps and flakes measuring from fractions of a micron to 200-300 microns. The physicochemical method of formation of aggregates is described and their effect on the balance of organic matter in the ocean and on present-day sedimentation is described. (Auth.)

J-35490
Kopelevich, O.V., **Approach to world ocean zonation in terms of optical parameters,** *Oceanology,* Dec. 1986 26(3), p.310-314, Translated from Okeanologiia. 26 refs.

The proposed method involves analysis of the physical factors that govern the large-scale lateral distribution of optical properties. The set of parameters describing the totality of these properties is given (not taking polarization into account). Equations for calculating these parameters from currently available optical and other data are presented. The 7 climatic zones—southern ice, southern humid, southern arid, and the northern ice, humid and arid zones—are shown on a chart and used for global optical zoning of the oceans. (Auth. mod.)

J-35501
Van Heijst, G.J.F., **On the oceanic circulation near a shelf-ice edge,** Dynamics of the West Antarctic Ice Sheet. Edited by C.J. van der Veen and J. Oerlemans, Dordrecht, D. Reidel, 1987, p.37-56, 18 refs.

This paper addresses the oceanic circulation near the shelf-ice edge, and concentrates on two aspects, namely the large-scale flow driven by wind stresses in the open sea, and the smaller-scale circulation driven by melting of the ice wall. Contrary to the expectation that (fresh) meltwater rises in a saline fluid environment, it is found that the latter simple flow pattern is destroyed by the presence of a salinity gradient in the ambient fluid.

J-35563
Jacobs, S.S., **Oceanology of the Antarctic Continental Shelf,** *Antarctic journal of the United States,* 1985 20(5), p.252-253, 16 refs.

A brief announcement is made of the completion of *Oceanology of the antarctic continental shelf,* a volume which was published in 1985 (see 15J-32971). It is the first oceanology volume to focus on this unusually deep and significant continental shelf region.

J-35582
Piola, A.R., Figueroa, H.A., Bianchi, A.A., **Some aspects of the surface circulation south of 20S revealed by First GARP Global Experiment drifters,** *Journal of geophysical research,* May 15, 1987 92(C5), p.5101-5114, 36 refs.

Daily averaged positions from about 280 satellite-tracked drifting buoys launched during the First GARP Global Experiment are used to estimate the sea surface current velocity field south of 20 S. The time-averaged surface velocity field based on velocity averages over 4 deg x 4 deg areas is used to construct the surface stream function. The gross features of the mean circulation are generally in agreement with other representations of the time-averaged circulation although they do differ in details from the climatological relative surface dynamic topographies in the Southern Hemisphere subtropical gyres. Mean and eddy horizontal momentum fluxes based on 2 deg x 2 deg grid are estimated for the region south of 40 S. The zonally averaged momentum flux at the sea surface for the region of the Antarctic Circumpolar Current, from 40 to 60 S, leads to a momentum flux divergence indicating a meridional flux of eastward momentum away from the current axis. Given the relatively large errors associated with the zonally averaged momentum fluxes, the sign of the flux divergence remains uncertain. (Auth.)

J-35584
Grelowski, A., Majewicz, A., Pastuszak, M., **Mesoscale hydrodynamic processes in the region of Bransfield Strait and the southern part of Drake Passage during BIOMASS-SIBEX 1983-84,** *Polish polar research,* 1986 7(4), p.353-369, 17 refs.

An attempt was made to describe the dynamics of water masses in the southern part of the Drake Passage and the Bransfield Strait from Dec. 1983 to Jan. 1984. The dynamic topography at the surface (referred to 500 db surface) allowed to define the eastward flow of water in the Bransfield Strait and to observe, in the same region, the presence of a rather weak counter-current of Weddell Sea origin. In the Drake Passage, a general north-eastern direction of water flow of the Bellingshausen Sea was found. In the Bransfield Strait, as well as in the Drake Passage, the relative velocities of geostrophic flow were low: 0.22 and 0.06 m/s, respectively. The analysis of Rossby and eddy numbers and Rossby radius made it possible to regionalize the dynamic phenomena but could not be fully used for their classification. (Auth.)

J-35625
Tréguer, P., Jacques, G., **Antarctic Ocean** [L'océan Antarctique], *Recherche,* June 1986 17(178), p.746-755, In French. 16 refs.

In the antarctic ocean region which sees a continual mixing of the waters of three of the world's large oceans, many paradoxes exist. The most puzzling of these is how a marine area, richest in nutrients, yet having such a poverty of phytoplankton, can support the large and diverse animal population inhabiting the region. This condition is discussed at length with consideration given to water chemistry, nutrients, water masses and currents, temperature, primary productivity, and the roles of krill, seals, and sea birds in the overall process.

J-35638
Seidov, D.G., **Modelling the world ocean climate and paleoclimate** [Modelirovanie klimata i paleoklimata mirovogo okeana], Modelirovanie gidrofizicheskikh poleĭ i protsessov v okeane. (Modelling of hydrophysical fields and processes in the ocean). Edited by A.S. Monin and D.G. Seidov, Moscow, Nauka, 1986, p.3-11, In Russian. 10 refs.

A numerical model of water circulation and the hydrological regime of the world ocean is presented. The model allows reproduc-

tion of the process of adjusting the fields of temperature, salinity and currents to the given atmospheric parameters and the bottom and coastal topography. It can be used to estimate contemporary circulation as well as to reconstruct climatic changes of the world ocean, in the Mesozoic and Cenozoic, connected with the continental drift.

J-35639

Enikeev, V.Kh., **History of Southern Hemisphere water circulation in the Mesozoic and Cenozoic** [Istoriia tsirkuliatsii vod IUzhnogo polushariia v mezozoe i kaĭnozoe], Modelirovanie gidrofizicheskikh poleĭ i protsessov v okeane. (Modelling of hydrophysical fields and processes in the ocean). Edited by A.S. Monin and D.G. Seidov, Moscow, Nauka, 1986, p.43-48, In Russian. 13 refs.

Paleoceanographic circulation of the Southern Hemisphere in Late Mesozoic and the Cenozoic is investigated within the framework of a numerical model. It is shown that continental drift affected oceanic paleocurrents and paleoclimates which differ significantly from today's climate. The Cenozoic glaciation was related to the formation of the Antarctic Circumpolar Current caused by the separation of Australia and Antarctica and the development of Drake Passage.

J-35640

Grachev, IU.M., IUshina, I.G., **Comparison of results of synoptic prognosis with data from studies of the Antarctic Circumpolar Current polygon south of Africa** [O sopostavlenii rezul'tatov sinopticheskogo prognoza s dannymi nabliudeniĭ na poligone k iugu ot Afriki v Antarkticheskom tsirkumpoliarnom techeniiȷ, Modelirovanie gidrofizicheskikh poleĭ i protsessov v okeane. (Modelling of hydrophysical fields and processes in the ocean). Edited by A.S. Monin and D.G. Seidov, Moscow, Nauka, 1986, p.55-60, In Russian. 24 refs.

Based on Seidov's numerical model, calculations were carried out on the evolution of synoptic eddies in the open areas of the ocean. The primary conditions were observed in full-scale surveys of the polygon in the Antarctic Circumpolar Current. It is found that theoretical results agree with the survey data. It is shown that cyclonic eddies occurring north of the main current shift toward the west by approximately 30 km during a period of the order of a week.

J-35658

Fukui, F., Otomo, K., Okabe, S., **Nutrients depression in the blooming area of Prydz Bay, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1986 Special issue No.44, Symposium on Polar Biology, 8th, 1985. Proceedings, p.43-54, 15 refs.

During the SIBEX cruise of *R.V. Kaiyo Maru* to the Indian Ocean in 1983/84, nutrient depression in the phytoplankton blooming was observed in the innermost part of Prydz Bay. The lowest concentrations of inorganic phosphate (0.30 microgram-at/l, dissolved total phosphorus (1.06 microgram-at/l), nitrate (10.5 microgram-at/l) and silicate (8 microgram-at/l) as well as chlorophyll *a* (2.19 microgram/l) was high. These low concentrations of inorganic nutrients are attributable to the consumption by phytoplankton. Phosphate and silicate seem to be consumed faster than nitrate. (Auth.)

J-35684

Whitworth, T., III, Nowlin, W.D., Jr., **Water masses and currents of the southern ocean at the Greenwich Meridian,** *Journal of geophysical research,* June 15, 1987 92(6), p.6462-6476, 51 refs.

The frontal structure of the Antarctic Circumpolar Current (ACC) at the Greenwich Meridian is similar to that at Drake Passage even though the current is not confined to flow between two continents: there are sharp horizontal gradients in all properties throughout the water column, the fronts are narrow relative to the total width of the current, and most of the transport occurs within the frontal zones. East of Drake Passage, saline North Atlantic Deep Water (NADW) is incorporated into the Circumpolar Current, and at the Greenwich Meridian it influences the water characteristics as far south as the Polar Front. Transport within the ACC at our section is about 20% greater than at Drake Passage, probably due in part to the addition of NADW. Separating the ACC from the Weddell Gyre is a sharp front, south of which the signature of all but the densest Circumpolar Deep Water (CDW) is lost by mixing with the surface waters. The intermediate water of the central Weddell Gyre is formed from this dense CDW, which is modified by biochemical processes to become oxygen poor and nutrient rich. Warm, salty, less dense CDW from the southern edge of the ACC rounds the eastern end of the gyre and appears in the southern limb, which meanders around Maud Rise. (Auth.)

J-35700

Matsuda, O., Ishikawa, S., Kawaguchi, K., **Oceanographic and marine biological data based on the routine observations near Syowa Station between Feb. 1984 and Jan. 1985 (JARE-25),** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1987 No.121, 21p., 2 refs.

A three-year program of marine biological investigations in the fast ice area near Showa Station is reported. Water samples for physical and chemical analyses were collected from different depths, between Feb. 18, 1984, and Jan. 6, 1985, at three locations, which are listed and shown on a map. Seasonal variations of ice breakage and formation processes are shown on charts; water temperature, salinity, chemistry and pigment ratio are tabulated. Some data on plankton collected by vertical haul are also presented.

J-35705

Iwanamy, K., Tohju, H., **Oceanographic data of the 26th Japanese Antarctic Research Expedition from Nov. 1984 to Apr. 1985,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1987 No.126, 59p.

The report presents the data of oceanographic observations on board the icebreaker *Shirase,* from Nov. 1984 to Apr. 20, 1985, and tidal observations at Showa Station. Oceanographic observations include surface temperature measurements, chemical analyses of sea water and expendable bathythermographic data. Serial observations were made at 46 stations; all results, together with meteorological data, are tabulated.

J-35750

Hayden, B.P., Ray, G.C., Dolan, R., **Classification of coastal and marine environments,** *Environmental conservation,* Autumn 1984 11(3), p.199-207, 25 refs.

Marine and coastal areas are classified in this paper according to attributes of the physical environment and by the faunal assemblages involved. Oceanic and coastal-margin realms are defined and mapped with the marginal seas and archipelagos named according to their connections to oceanic realms. There are seven types of ocean realms and thirteen types of coastal-margin realms. Latitudinal symmetry is present between hemispheres and from ocean basin to ocean basin. The defining characteristics for these realms are the seasonal variations in ocean surface currents and the companion seasonal variations in the main wind-currents of the atmosphere. Forty faunal provinces are indicated on the six maps of the oceanic and coastal realms, one of the maps showing the proposed classification in the antarctic region. (Auth. mod.)

J-35751
Barrera, E., Huber, B.T., Savin, S.M., Webb, P.N., **Antarctic marine temperatures: late Campanian through early Paleocene,** *Paleoceanography,* Feb. 1987 2(1), p.21-47, Refs. p.44-47.

An oxygen isotope paleotemperature study of benthic foraminifera from the upper Campanian through lower Paleocene section at Seymour I. was done in conjunction with careful scanning electron microscope observations to monitor the state of foraminiferal preservation. The isotopic compositions of those samples which were deemed to be well preserved were the basis of the conclusion that Campanian through Paleocene high-latitude shelf waters near Antarctica had temperatures between approximately 4.5 and 10.5 C. Temperatures during early and middle Maastrichtian time were slightly higher than those of either the late Campanian or late Maastrichtian. The inference of temperate climatic conditions in Antarctica is in agreement with paleoclimatic conclusions drawn on the species composition of the planktonic foraminiferal assemblages and the character of the planktonic foraminifera. Campanian through early Paleocene deep ocean waters, at least in the Pacific and perhaps elsewhere as well, could have formed by sinking of surface waters in polar regions. (Auth. mod.)

J-35757
Fischer, J.K., **Nannosestone in coastal surface currents of South America and South Atlantic,** *Polskie archiwum hydrobiologii,* 1987 34(1), p.25-34, 8 refs.

The distribution of suspensions with particle diameters of 2-40 micron in surface waters of: Brasilian Current, Falkland Current, West Drift Current, Weddell Current, Cap Horn Current and Peruvian Current was investigated. It was found that as a rule on the boundary of currents a change occurs in size spectrum and volume concentration of nannosestone in water. No such changes were observed at the Antarctic Convergence line. (Auth.)

J-35854
Middleton, J.H., Foster, T.D., Foldvik, A., **Diurnal shelf waves in the southern Weddell Sea,** *Journal of physical oceanography,* June 1987 17(6), p.784-791, 16 refs.

Strong evidence is presented for the existence of barotropic shelf waves at diurnal frequencies in the shelf-break region of the southern Weddell Sea. Rotary spectra from long-term current meter records on the slope, at the shelf break and on the shelf show the same rotational sense as that predicted by a barotropic model. Phase speeds of the zero-mode shelf waves calculated from tidal analysis and rotary coherencies of current meter pairs oriented in an along-shelf direction are in the same range as that predicted by barotropic theory except for the O1 constituents. The weak stratification of the Weddell Sea in the region of the slope results in nearly barotropic motion at diurnal frequencies. The anomalous behavior of the O1 constituent could not be explained. (Auth.)

J-35858
Ventajas, L., **Polynucleate hydrocarbon concentrations from oil spilled in seawater** [Incidencia del aceite derramado sobre la concentración de hidrocarburos polinucleados en aguas de mar], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1986 No.322, 15p., In Spanish with English, French and German summaries. 5 refs.

A study on the variation of the concentration of polynucleate hydrocarbons in the course of time, when a ship anchored in stations adjacent to the Weddell Sea spilled oil, showed the following: near Marambio Station, the concentration of polynucleates increased at the time the ship was surrounded by ice, and decreased when the ice disappeared. Near Belgrano II Station, the concentration of polynucleates increased in the course of time until it reached a constant. It is concluded that the ice acts as a barrier preventing the longitudinal and transversal diffusion of polynucleate hydrocarbons and allowing them to concentrate. (Auth. mod.)

J-35888
Martínez, C.M., **Physical and chemical oceanographic work** [Trabajos en oceanografía fisica y quimica], *Montevideo. Instituto Antártico Uruguayo. Actividad científica, 1985/86,* Mar. 20, 1987 Vol.1, p.13-19, In Spanish with English summary. 8 refs.

Oceanographic investigations carried out jointly by scientists from Uruguay and Argentina, during Jan. and Feb. 1986 in Drake Passage, Weddell and Bellingshausen seas and the Bransfield Strait, are reported. They include a total of 129 bathythermographic profiles up to 750 m in depth, and water sample collection at 23 oceanographic stations. Details concerning instrumentation and data processing of the research in progress are offered.

J-35923
Humphries, S.E., **FIBEX cruise to the Prydz Bay region, 1981: nutrient data,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Feb. 1987 No.43, 53p.

Nitrate, phosphate and silicate data collected at selected CTD stations on the FIBEX cruise between Jan. and Mar. 1981 are plotted with depth and the raw data are tabulated. Sampling station locations and the average concentration of each nutrient in the top 100 m of the water column are mapped. (Auth.)

J-35924
Humphries, S.E., **ADBEX I cruise to the Prydz Bay region, 1982; nutrient data,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Feb. 1987 No.44, 83p.

Nitrate, phosphate and silicate concentrations obtained during the ADBEX I cruise to the Prydz Bay region in Nov. and Dec. 1982 are plotted with depth and the raw data are tabulated. Locations of the sampling stations and the average concentration of each nutrient in the top 100 m of the water column are mapped. (Auth.)

J-35925
Humphries, S.E., **SIBEX II cruise to the Prydz Bay region, 1985: nutrient data,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Feb. 1987 No.45, 101p.

Nitrate, phosphate and silicate concentrations, obtained during the SIBEX II cruise to the Prydz Bay region in Jan. 1985, are plotted with depth and the raw data re tabulated. Nitrite concentrations were insignificant and values are only tabulated. The locations of the sampling stations and the average concentration of each nutrient in the top 100 m of the water column are mapped. (Auth.)

J-35926
Humphries, S.E., **ADBEX III cruise west of the Prydz Bay region, 1985: nutrient data,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Feb. 1987 No.46, 69p.

Nitrate, phosphate and silicate concentrations measured on the ADBEX III cruise to an area west of the Prydz Bay region (49 to 65 E and 55 to 66 S) from Oct. to Dec. 1985, are plotted with depth and the raw data are tabulated. Nitrite and manganese values are also tabulated. The cruise track, the location of the sampling stations and the average concentration of nitrate, phosphate and silicate in the top 100 m is mapped. (Auth.)

J-35932
Sarukhanian, E.I., **Soviet-American field experiment "Weddell-POLEX-81"** [Sovetsko-amerikanskiĭ naturnyĭ eksperiment "Uedell-POLEKS-81"], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.9-18, In Russian. 3 refs.

A Soviet-American expedition, carried out on board the Soviet ship *Mikhail Somov* during Oct.-Nov. 1981, is described. The investigations were aimed at: oceanic processes in the Weddell Sea in relation to basic mechanisms responsible for the formation of polynyas and development of the bottom water; the interaction between ocean and atmosphere in ice-free areas as well as in areas with variable density of ice; the hydrochemical conditions in relation to the ecology of biological organisms; the yearly life cycle of the southern ocean biomass; the physical and chemical properties of sea ice in relation to winter navigation in the southern ocean; and the monitoring of atmospheric circulation. A list of participants is presented.

J-35933
Bagriantsev, N.V., Sarukhanian, E.I., **Southern ocean thermohaline water stratification according to ice cover data of the "Weddell-POLEX-81" expedition** [Osobennosti termokhalinnoĭ stratifikatsii vod IUzhnogo okeana pri nalichii ledianogo pokrova po dannym ekspeditsii "Uedell-POLEKS-81"], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.18-27, In Russian. 7 refs.

Oceanic data, collected during the "Weddell-POLEX-81" expedition on board the Soviet ship *Mikhail Somov*, on water mass distribution and mixing of the Antarctic Circumpolar Current with the warm Weddell counter-current, and their interaction with the warm and strong winds blowing over the Weddell Sea, are reviewed. Since the water masses investigated were entirely covered by ice, the data obtained are considered to be particularly valuable in the study of the formation of the thermohaline structure in the compacted ice edge zone of the southern ocean.

J-35936
Antipov, N.N., **Water mass structure in the area of Maud Rise in Oct. 1981** [Struktura vodnykh mass v raĭone podniatiia Mod v oktiabre 1981 g.], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.41-45, In Russian. 7 refs.

Oceanographic data obtained during the Soviet-American expedition "WEPOLEX-81", on board the ship *Mikhail Somov* in Oct.-Nov. 1981, in the Weddell Sea, are presented. Analysis revealed 5 types of water masses: Antarctic Surface Water, Weddell Deep Water mixed with the Circumpolar Deep Water, Antarctic Bottom Water and the Weddell Bottom Water. Their mean characteristics, such as temperature, salinity, oxygen and biogenic contents, are tabulated and discussed.

J-35943
Bogorodskiĭ, P.V., Makshtas, A.P., **Spatial and temporal variability of the sound velocity field in the Maud Rise area** [Prostranstvenno-vremennaia izmenchivost' polia skorosti zvuka v raĭone podniatiia Mod], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.72-75, In Russian. 5 refs.

Results of hydrophysical investigations, centered on the distribution of speed of sound waves in the Weddell Sea, are presented. Data show measurements in the range of 1400 to 1600 m/s, with maximum error of 0.2 m/s and minimum sensitivity of 0.01 m/s. In depths greater than 300 m, the field of sound velocity was determined by an empirical formula based on temperature and salinity measurements at different depths. A table shows a strong spatial irregularity in the 110-140-m layer. It is found that in the deep waters of the Weddell Sea the warm eddies move in a westerly direction; this cyclonic rotation is responsible for the convective instability of the upper 300-m layer in the Maud Rise region.

J-35945
Sarukhanian, E.I., Tokarchik, R., **Hydrological conditions in Admiralty Bay in summer 1982** [Gidrologicheskie usloviia v zalive Admiralti letom 1982 g.], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1986 Vol.108, p.78-85, In Russian. 5 refs.

In 24 oceanographic stations, established between Jan. 28 and Feb. 16, 1982, in Admiralty Bay, temperature, salinity and dissolved oxygen content—ranging from 0.36-2.23C, 31.5-34.5%, and 5.69-8.24ml/l, respectively—were measured in a water layer from 0 to 250 m. The data obtained served as a basis for estimating the hydrological conditions in the Bransfield Strait, whose waters border on those of Admiralty Bay. These waters were found to differ in that the vertical convection, originated by the freezing of the Strait's waters, results in a renewal of deep waters, while the rises along the borders of the Strait prevent the intermixing of the Strait's waters with those of neighboring regions.

J-35950
Bagriantsev, N.V., **Numerical modelling of the southern ocean circulation** [Chislennoe modelirovanie tsirkuliatsii IUzhnogo okeana], *Problemy Arktiki i Antarktiki; sbornik statei,* 1986 Vol.62, p.63-71, In Russian. 25 refs.

Calculations of the southern ocean circulation, based on data from 4,500 hydrological stations covering the period 1900-1979, are presented. Long period averages of the water density distribution were obtained by the S. Levitus and A. Oort method; the mean annual distribution was obtained for 25 layers from 0 to 4500 m. Eastward transport by the Antarctic Circumpolar Current is calculated and compared with measurements.

J-35980
Kerry, K.R., Woehler, E.J., Robb, M.S., **Oceanographic data: Prydz Bay region—SIBEX II, MV *Nella Dan,* Jan. 1985,** *Australian National Antarctic Research Expeditions. ANARE research notes,* July 1987 No.53, 122p., 4 refs.

Sixty-four CTD stations were taken during the SIBEX II cruise in Jan. 1985 as a supplement to the krill research program. Casts were made to 1000 m or to near bottom if shallower, along a series of north-south transects from 60 S to the continental shelf of Antarctica between 60 E and 90 E. *In situ* salinity, temperature and sigma-t are tabulated for standard depths, and shown graphically. T/S plots for each station are given. (Auth.)

J-35981
Woehler, E.J., Kerry, K.R., Humphries, S.E., Robb, M.S., **Oceanographic data: Enderby Land region—Antarctic Division BIOMASS Experiment III, MV *Nella Dan,* Sep.-Dec. 1985,** *Australian National Antarctic Research Expeditions. ANARE research notes,* July 1987 No.54, 111p., 8 refs.

Fifty CTD stations were taken during the ADBEX III cruise, Sep.-Dec. 1985 between the northernmost margin of the sea-ice and the antarctic coast when the sea-ice was near its maximum extent. Casts were made to 2000 m or to near bottom over the continental shelf. *In situ* salinity, temperature and sigma-t are tabulated for standard depths, and shown graphically. T/S plots for stations are given. (Auth.)

J-36101
Schlosser, P., Roether, W., Rohardt, G., **Helium-3 balance of the upper layers of the northwest Weddell Sea,** *Deep-sea research,* Mar. 1987 34(3A), p.365-377, 22 refs.

Helium-3 data of the upper water column (800 m) at stations in the northwestern Weddell Sea and in the Bransfield Strait are presented and discussed in relation to the hydrography. From the observations a He-3 balance for the winter mixed layer is proposed, which allows to estimate the rate of entrainment of Warm Deep Water (WDW) into the Winter Water to be between 15 and 35 m.y. The vertical eddy diffusivity within the pycnocline above the Warm Deep Water core is determined. Of the assumptions required to obtain the WDW entrainment estimate, that of quasi-stationarity of the gas transfer across the pycnocline appears to be the most critical one, but other assumptions appear to require further study as well. (Auth. mod.)

J-36182
Poisson, A., Chen, C.-T.A., **Why is there little anthropogenic CO2 in the Antarctic Bottom Water,** *Deep-sea research,* July 1987 34(7A), p.1255-1275, Refs. p.1273-1275.

Late-winter and early-spring carbonate data compared with summer data confirm the notion that the Weddell Sea pack ice effectively blocks the air-sea exchange of gases. The upwelled old Weddell Deep Water (WDW) dilutes the anthropogenic CO2 concentration in the winter surface water, which then mixes with the Weddell Shelf Water and more WDW to form the Antarctic Bottom Water (AABW). Since the WDW probably was formed before industrialization and the winter surface water is also deficient in excess CO2, it was expected and found that the AABW contains little anthropogenic CO2. The dilution of the winter surface water by the old WDW also explains why less excess CO2 is found in the remnant winter water (the minimum temperature layer) than in the surface water for the GEOSECS and IGY summer stations. The pre-industrial CO2 concentration is estimated to be 268 micro-atm. (Auth.)

J-36186
Kobarg, W., Lippmann, E., **Tidal movement measurements on the Ekström Ice Shelf, Antarctica** [Gezeitenmessungen auf dem Ekström-Schelfeis, Antarktis], *Polarforschung,* 1986 56(1/2), p.1-21, In German with English summary. 14 refs.

Part of the geophysical work at the German Georg von Neumayer Station is the recording of the tidal movement of the Ekström Ice Shelf. Measurements are performed with an earthtide gravity meter for the vertical component of the movement and two simple tiltmeters for the horizontal components. Gravity measurements were done continuously during the 1984/85 winter season at the observatory of the Georg von Neumayer Station. Tilt measurements were carried out at the station and at three locations on an ice-rise at about 10 km distance from the station. Gravity measurements provide the tidal movements of the ice shelf, which amounts to about 1 m at spring tide. The most important result of the tiltmeter measurements lies in the fact that the amplitudes of tilt are substantially larger at the ice-rise than at the observatory. Results of tide-correlated ice quake activities are also presented. (Auth.)

J-36230
Botnikov, V.N., Chuguĭ, I.V., **Hydrological observations in the Davis Sea in the POLEX-South program** [Gidrologicheskie issledovaniia v more Deĭvisa po programme POLEKS-IUg], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.80, p.122-129, In Russian. 1 ref.

Data collected in the Davis Sea on board the *Mikhail Somov* from 36 stations between Apr. 15 and 28, 1978, are presented. They include the distribution of temperature, salinity, and dissolved oxygen in surface waters and those over the continental slope. From the analysis of results obtained, an estimate is made of the circulation and origin of the water masses at the surface and 100, 200 and 300 m.

J-36250
Ikeda, Y., Silveira Mascarenhas, A. da, Jr., Cacciari, P.L., Nonato, L.V., **Synoptic account of the Subtropical and Antarctic Convergence** [Um levantamento sinótico das Convergencias Antarctica e Subtropical], *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.111-116, In Portuguese with English summary. 14 refs.

Temperature profiles of the water column (0-750 m) were obtained with XBT along two tracks during the 2nd Brazilian Antarctic Expedition. During the first track the Antarctic Convergence zone was observed between 57 deg 30'S and 58S, with a horizontal gradient of 3.5 C/42 km. A bulk temperature of 6 C was identified as the Antarctic Circumpolar Current, a length scale of 130 km width was estimated for the cross section. The second track crossed again the Antarctic Convergence zone 16 days later at 55 deg 20'S, approximately, suggesting a mean latitudinal displacement of 15 km/day. The second pass across the Convergence showed a warming in the temperature field. (Auth. mod.)

J-36251
Ikeda, Y., **Environmental parameters of the Bransfield Strait, Antarctica,** *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.117-135, 12 refs.

Hydrographic data based on Nansen-bottle casts were obtained in the Bransfield Strait during Jan. and Feb. 1983 The temperature and salinity values ranged from -1.2 C to 2.0 C and 33.8 to 34.6, respectively. The cold (more saline) and the warmer (less saline) waters are found close to the Antarctic Peninsula and the South Shetland Is. respectively, suggesting the influence of the Weddell Sea Water which through advective and mixing processes contributes to the formation of water masses in the Strait. The upper 600 m of the water column show a decrease in the temperature (up to -1.2 C) and an increase in the salinity (up to 34.6); temperature inversions associated with vertical instabilities of the water column were found usually in the upper 50 m depth. The geostrophic circulation relative to the 200 and 400 dbar isobaric surfaces, indicates a weak meandering surface current flowing towards NE, in agreement with previous studies in the area. (Auth. mod.)

J-36253
Paviglione, A.M., Ikeda, Y., Cacciari, P.L., **Thermal structure of Bransfield Strait and Drake Passage** [Estrutura térmica do Estreito de Bransfield e da Passagem de Drake], *Academia Brasileira de Ciencias. Anais,* 1986 58(1-Suppl.), p.149-156, In Portuguese with English summary. 5 refs.

A comparative description of the vertical and horizontal temperature fields sampled along and across the Bransfield Strait was done using data collected during the 2nd Antarctic Brazilian Expedition. In the horizontal distributions of temperature we can notice that the lowest temperature values (-1.4 C in the surface layer and -1.1 C at 100 m), are observed NE of the Antarctic Peninsula and the highest values (2.7 C in the surface layer and 0.5 C at 100 m), northward of South Shetland I. The vertical distributions of temperature show a layer of minimum temperature (0.5 C) between depths of 100 and 200 m across the Bransfield Strait. This minimum temperature layer is found to vary from depths of 100 m to 250 m toward higher latitudes in the vertical sections oriented parallel to the Bransfield Strait in the Drake Passage. (Auth.)

J-36271
Gregory, M.R., **Plastics and other seaborne litter on the shores of New Zealand's subantarctic islands,** *New Zealand antarctic record,* 1987 7(3), p.32-47, 23 refs.

Contamination of open ocean and coastal surface waters by plastics and other man-made debris is today a topic of increasing concern to environmentalists. This report deals with observations on quantities and sources of plastic and other man-made items stranding on the shores of New Zealand's subantarctic islands. Most readily accessible shores were examined other than those around the deeply indented harbors characterizing the eastern (leeward) sides of Campbell and Auckland Islands. The nature of the terrain ensured that intensive sampling for mainland shores was impossible. Hence, quantitative expression in terms of number of items per kilometer of shore is not considered appropriate. Some shore localities were 'scanned' from afar (cliff tops, zodiac, helicopter). Types and distribution of various kinds of litter, both natural and man-made, are noted and an assessment of its impact on these subantarctic islands is given. (Auth. mod.)

J-36318
Liebezeit, G., Bodungen, B. von, **Biogenic fluxes in the Bransfield Strait: planktonic versus macroalgal sources,** *Marine ecology progress series,* Mar. 1987 36(1), p.23-32, 56 refs.

Fluxes of organic carbon and nitrogen, total phosphorus, chlorophyll pigments, carbohydrates, amino acids and amino sugars were determined for a depth-series sediment trap experiment in Nov./Dec. 1983 in the Bransfield Strait, Antarctic Peninsula. Absolute and/or relative increases of phosphorus, glucose and chlorophyll *b* fluxes and decrease of beta-alanine flux with depth suggest a second source of sedimenting organic material besides plankton. This is identified as originating from shallow water macroalgae. Quantification of this contribution shows increases from 37% at 539 m to 71% at 1835 m. Comparison of corrected planktonic fluxes with values predicted by an earlier empirical equation are in good agreement. Examination of carbohydrate spectra from Bransfield Strait surface sediments shows a macroalgal imprint to be present. (Auth.)

J-36356
Ballester, A., Rovira, J., Castellví, J., Juliá, A., ***Antartic' 86* Expedition. Scientific results** [Expedición *Antartic' 86.* Resultados científicos], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.1-20, 8 refs., In Spanish with English summary.

The *Antarctic' 86* Spanish expedition (Nov. 23, 1986-Jan. 10, 1987) originated in the port of Vigo on board the R/V *Prof. Siedlecki.* Automatic-sequential (on line) analysis of temperature, salinity, nitrates, nitrites, silicates and chlorophyll was made, without any interruption, from Canary Is. to Admiralty Bay (South Shetland Is) on sea water sampled from -4 m depth. Results are presented in numerous charts and tables. It is suggested that the chemical composition of sea water particular to that area is influenced by such factors as the sea ice cover and the submerged volcanic rocks. (Auth. mod.)

J-36357
Escánez, J.E., **Preliminary observations on the distribution of micronutrients during the *Antártida 8611* cruise (Nov. 1986-Feb. 1987)** [Observaciones preliminares sobre la distribución de micronutrientes durante la campaña *Antártida 8611* (Noviembre 1986-Febrero 1987)], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.21-36, 10 refs., In Spanish with English summary.

The cruise *Antártida 8611* was carried out in the Scotia Sea and Bransfield Strait during the austral summer 1986-1987. Fifty deep sampling hydrographic stations were studied for different physicochemical parameters. Among these were dissolved micronutrients, nitrates, nitrites, phosphates and silicates, sampled down to 500 m depth. Some representative profiles are described and the N/P and Si/N ratios for the different areas are compared. Distribution of micronutrients in the lagoon of Deception I. is also studied. (Auth. mod.)

J-36358
Alvarez Meneses, A., **Chlorophyll *a* distribution in the Atlantic sector of the Antarctic in the austral summer 1986-1987, *Antártida 8611*** [Distribución de clorofila *a* en el sector Atlántico del Océano Antártico durante el verano austral 1986-1987 *Antártida 8611*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.37-46, 4 refs., In Spanish with English summary.

The study was carried out in the Scotia Sea and nearby areas, Nov. 25, 1986-Feb. 2, 1987, the determination of chlorophyll *a* distribution being one of the principal goals. A total of 58 oceanographic stations were studied on board the fishing vessel *Pesca Puerta IV.* The results show a high concentration of chlorophyll *a* around Orkney Is. and minimum values around South Shetland Is. and Bransfield Strait, with the exception of station 535, in the interior of Deception I., and station 512 in its vicinity. (Auth. mod.)

J-36359
Juliá, A., **Analysis of tides observed at Arctowski Station (King George Island), Nov.-Dec. 1986** [Análisis de las mareas observadas en la estación H. Arctowski (Isla de King George) entre Noviembre y Diciembre de 1986], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.47-53, In Spanish with English summary.

During the stay of the Spanish expedition at Arctowski Station, data on sea level, atmospheric pressure and wind conditions were regularly collected. The results of the analysis of the data using the autocorrelation test applied to the time series, are presented. In order to minimize the effect of air pressure on the sea level, the data were reduced to 1013.25 HPa. Before calculation of the correlation coefficient, the time series was also standardized. The results allow to identify the most significant periods contained in the series. (Auth. mod.)

J-36360
Ballester, A., Manriquez, M., **Results of the *Magga Dan* cruise during the austral summer of 1966-1967** [Resultados de la Campaña *Magga Dan* durante el verano austral 1966-1967], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.55-68, 3 refs., In Spanish with English summary.

As a part of the *Magga Dan' 66* cruise, a study was carried out of the physical (temperature and density) and chemical parameters of the sea water between Cape Town and Breid Bay, off Queen Maud Land, analyzing samples from 9 stations. The results, shown in charts, obtained by a newly introduced and described method, are found to be highly satisfactory and quantitatively correct when compared to results obtained by other, tested, methods. (Auth. mod.)

J-36362
Grimalt, J.O., Albaigés, J., Rovira, J., Ballester, A., **Dissolved and particulate lipids in Bransfield Strait, *Antartic' 86*** [Lípidos en fase disuelta y particulada de las aguas del estrecho de Bransfield, *Antartic' 86*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.79-87, 9 refs., In Spanish with English summary.

This initial report on the lipid composition of the waters of Bransfield Strait shows that it consists mainly of fatty acids (free and esterified) and sterols, reflecting a predominant algal input. Among these components there is an important proportion of labile species (mono- and diunsaturated fatty acids, diunsaturated sterols) which points to a low degree of microbial activity in the area as well as to good physico-chemical conditions of preservation. (Auth.)

J-36364
Ballester, A., **Distribution and levels of heavy metals in antarctic and subantarctic waters. BIOMASS-III Expedition *Antartic' 86*** [Distribución y trascendencia de los metales pesados presentes en aguas antárticas y subantárticas. Expedición Biomass-III, *Antartic' 86*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.99-105, 12 refs., In Spanish with English summary.

An operative and sensitive procedure was developed to determine trace element concentrations in ocean waters. This method involves the following steps: sampling, filtration, complexation, solid-phase extraction, clean-up and Zeeman Graphite Furnace A.A.S. Analysis. This procedure has been applied in studying zinc, copper, manganese, lead and iron levels in antarctic and subantarctic sea water samples collected during BIOMASS-III Expedition cruise *Antartic' 86.*

J-36365
Rovira, J., **Chlorinated hydrocarbons in water samples from Bransfield Strait. BIOMASS-III Expedition *Antartic' 86*** [Hidrocarburos clorados en muestras de agua del estrecho de Bransfield. Expedición Biomass-III, *Antartic' 86*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.107-115, 10 refs., In Spanish with English summary.

Presented are results of analyses of chlorinated hydrocarbons (PCB's and chlorinated pesticides) in dissolved and particulate phases in water samples from Bransfield Strait. The analyses were done using high resolution gas chromatography. The concentrations found for all the contaminants studied were in the same very low ranges as those reported in previous works for antarctic seas. The levels found in the samples from Bransfield Strait are lower than those calculated in samples from the Atlantic Ocean. (Auth.)

J-36366
Sánchez-Pardo, J., Rovira, J., **Aliphatic and polycyclic aromatic hydrocarbons in Bransfield Strait waters. BIOMASS-III Expedition, *Antartic' 86*** [Hidrocarburos alifáticos y aromáticos policíclicos detectados en aguas del estrecho de Bransfield. Expedición Biomass-III, *Antartic' 86*], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.117-124, 5 refs., In Spanish with English summary.

This work deals with the analyses of aliphatic hydrocarbons (C14 to C32) and polycyclic aromatic hydrocarbons (PAH's) realized in sea water samples from Bransfield Strait, as a part of general sampling taken in Biomass III cruise. The samples were fractionated in dissolved and particulate phases obtained by passing a 100 l sample of sea water through the sampling system: a glass fiber filter (GF/F, 0.7 microns) and an Amberlite column (XAD-2). High Resolution gas chromatography techniques were used. The capillar column employed was a RSL-200 phase, chemically bonded, 25 m long and 0.2 micrometer phase thickness. The samples were observed for aliphatic hydrocarbons, covering the range of 3-10 ng/l, showing a carbon preference index below 1.0. Phenantrene was the predominant PAH in the samples studied. (Auth.)

J-36405
Bryan, F., **High-latitude salinity effects and interhemispheric thermohaline circulations,** *Nature,* Sep. 25, 1986 323(6086), p.301-304, 18 refs.

A general circulation model for the ocean is used to investigate the interaction between the global-scale thermohaline circulation and the salinity distribution. It is shown that an equatorially asymmetric circulation can be maintained even under equatorially symmetric basin geometry and surface forcing. Multiple equilibrium solutions are obtained for the same forcing by perturbing the high-latitude salinity field in an otherwise equatorially symmetric initial condition. The timescale of the transition from the symmetric circulation to an asymmetric circulation depends critically on the sign of the initial salinity perturbation. Accompanying figures include data for the antarctic and sub-antarctic regions. (Auth. mod.)

J-36468
Kerry, K.R., Woehler, E.J., Wright, S., Dong, Z., **Oceanographic data: Prydz Bay region—FIBEX, MV *Nella Dan,* January-March 1981,** *Australian National Antarctic Research Expeditions. ANARE research notes,* June 1987 No.49, 114p., 6 refs.

Fifty-two CTD stations were taken during the FIBEX cruise to Prydz Bay, Jan.-Mar. 1981 as a supplement to the krill research program. Two stations were taken daily close to solar noon and solar midnight. Casts were made to 200 m or to near bottom if shallower. *In situ* salinity, temperature and sigma-t are tabulated for standard depths, and shown graphically. T/S plots for each station are given. (Auth.)

J-36470
Woehler, E.J., Shearer, J., Kerry, K.R., **Oceanographic data: Prydz Bay region—geoscience cruise, MV *Nella Dan,* January-March 1982,** *Australian National Antarctic Research Expeditions. ANARE reseach notes,* July 1987 No.51, 22 refs., 6 refs.

Seven CTD stations were taken during the geoscience cruise, Jan.-Mar. 1982 as a supplement to a seismic survey in the vicinity of Prydz Bay. Stations were taken on an opportunistic basis. *In situ* salinity, temperature and sigma-t are tabulated for standard depths, and shown graphically. T/S plots for each station are given. (Auth.)

J-36471
Kerry, K.R., Woehler, E.J., **Oceanographic data: Prydz Bay region—Antarctic Division BIOMASS Experiment I, MV *Nella Dan,* November-December 1982,** *Australian National Antarctic Research Expeditions. ANARE research notes,* July 1987 No.52, 166p., 4 refs.

Seventy-nine CTD stations were taken in Prydz Bay and adjacent waters during the ADBEX I cruise, Nov.-Dec. 1982. At this time much of Prydz Bay was ice covered and so a grid of stations was taken rather than transect lines. Casts within the shelf zone were made to the bottom and to 2000 m offshore. *In situ* salinity, temperature and sigma-t are tabulated for standard depths, and shown graphically. T/S plots for each station are given. (Auth.)

J-36514
Ventajas, L., **Polycyclic hydrocarbon content in antarctic sea water samples** [Estudios del contenido en hidrocarburos policiclicos en muestras de agua de mares antárticos], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.333, 15p., In Spanish with English, French and German summaries. 5 refs.

The concentrations of dicyclic, tricyclic and tetracyclic hydrocarbons in samples obtained from the antarctic seas were studied. It is found that there is, proportionally, a high concentration of dicyclic hydrocarbons and the reasons why this happens are discussed; the data obtained are compared with those of samples from contaminated seas, Fuegian petroleum and ice. (Auth.)

J-36532
Fedulov, P.P., **Boundary of the Weddell Sea in the eastern part of the Atlantic sector of Antarctica,** *Oceanology,* Feb. 1987 26(4), p.407-409, Translated from Okeanologiia. 8 refs.

Based on hydrological survey carried out between 18W and 20E in June 1982, the position of the front separating the waters of the Weddell Sea from those of the Antarctic Circumpolar Current was determined. The front is clearly distinguishable within the fields of hydrophysical characteristics. The eastern boundary of the Weddell Sea water was observed along 20-22E during the survey period. (Auth. mod.)

J-36533
Brekhovskikh, A.L., Demin, IU.L., Usychenko, I.G., Shcherbinin, A.D., **New schematic patterns for the seasonal climatic circulation of the Indian Ocean,** *Oceanology,* Feb. 1987 26(4), p.416-422, Translated from Okeanologiia. 11 refs.

Generalized patterns have been constructed for summer and winter seasonal climatic currents in the Indian Ocean. The patterns are based on diagnostic calculations using a quasigeostrophic model on a one-degree grid using seasonal density and wind values averaged over many years. Along with the well-known large-scale circulation systems, these patterns exhibit a number of new features on smaller scales. (Auth.)

J-36534
Murav'ev, S.S., Nozdrin, IU.V., Pyzhevich, M.L., **Thermohaline finestructure in the Antarctic Circumpolar Current along a section at 25E,** *Oceanology,* Feb. 1987 26(4), p.428-432, Translated from Okeanologiia. 3 refs.

The characteristics of the finestructure were analyzed along a section at 25E passing through the antarctic circumpolar current in the layer from 150 to 700 m. The finestructure includes inhomogeneities with scales from 40 cm to 33 m, and is analyzed for various water masses of the section. It was found that the ratio of the spectral densities for variations in the temperature and salinity fields decreases with increasing wave number. The value of the spectral density for variations in the temperature field increases toward the south in the section and also in regions where eddy formations interact. (Auth.)

J-36566
Eremeev, V.N., Ivanov, L.M., **Ocean tracers: transport parametrization, numerical modelling of dynamics** [Trassery v okeane: parametrizatsiia perenosa, chislennoe modelirovanie dinamiki], Kiev, Naukova dumka, 1987, 144p., In Russian. 220 refs.

Problems related to numerical modelling of tidal, inertial and synoptic variations of ocean currents are analyzed through extensive review of pertinent literature. Sections of the 4th chapter of the book deal with optimum placing of surface buoys for studying ocean circulation in the South Atlantic Ocean and calculations of surface circulation of the southern ocean, between latitudes 20 and 65S, based on drifting buoy data obtained during the PGEP Experiment. Average monthly circulation and temperature values for Jan. 1979, and isotope distribution of radium-228 concentrations, are discussed and shown on charts. A relationship between the latter and the current depth dynamics is established.

J-36575
Ohno, M., Fukuda, Y., Fukuchi, M., **Vertical distribution and standing stocks of chlorophyll *a* in the coastal waters of the antarctic ocean,** *Antarctic record,* July 1987 31(2), p.93-108, 15 refs.

The vertical distributions of chlorophyll *a,* phaeophytin and oceanographic parameters to a depth of 200 m were investigated in 3 areas: 9 stations in Breid Bay, 7 stations off the Gunnerus Bank and 7 stations in Lützow-Holm Bay. Water temperature ranged from -1.87 to 2.1 C, and salinity ranged from 32.63 to 34.63. Salinity was 32.63-33.95 throughout the upper 0-50 m layer, in which chlorophyll *a* was abundant. In Breid Bay, integrated chlorophyll *a* stocks (0-200 m) decreased from 230.0-410.7 mg/sq m in Dec. to 95.1-207.2 mg/sq

m in Feb. In the waters across the Gunnerus Bank, integrated stocks ranged from 41.9 to 116.5 mg/sq m in Feb. In the waters off Lützow-Holm Bay, the stocks remained between 46.0 and 78.3 mg/sq m. The phaeophytin content was large at almost all the stations. (Auth.)

J-36581

Iwanaga, Y., Tohju, H., **Oceanographic data of the 27th Japanese Antarctic Research Expedition from Nov. 1985 to Apr. 1986,** *Japanese Antarctic Research Expedition. JARE data reports,* July 1987 No.127, 56p.

This report presents the data of oceanographic observations on board the icebreaker *Shirase* and tidal observations at Showa Station. The oceanographic observations were carried out in the summer mission of JARE-27, in 1985-1986, and tidal observations were carried out in the winter mission of JARE-26, in 1984-1985. Included are surface temperature measurements and surface water chemical analyses, the expendable bathythermography, the conductivity temperature and depth profiling system observations, and serial observations carried out at 26 stations. All the results, together with meteorological data, are tabulated.

J-36582

Douglas, B.C., McAdoo, D.C., Cheney, R.E., **Oceanographic and geophysical applications of satellite altimetry,** *Reviews of geophysics,* June 1987 25(5), p.875-880, Refs. p.878-880.

One of the most difficult aspects of the use of altimeter data is finding the correct track point over land and ice surfaces. Waveform data must be carefully analyzed to solve this problem. This has been accomplished to a high degree of precision and applied successfully to the Greenland and antarctic ice fields. Important new insights into the nature of satellite ephemeris error and its influence on altimetrically derived sea surface topography are discussed. (Auth. mod.)

J-36705

Saki, T., **Preliminary report of geological and geophysical surveys off Queen Maud Land, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.23-40, 15 refs.

Geological and geophysical surveys off Queen Maud Land were carried out during the 1985-1986 season using R/V *Hakurei-Maru.* The survey covered areas of Gunnerus Ridge and the upper continental rise to the abyssal plain off Showa Station. The basement of Gunnerus Ridge is supposed to be continental crust according to magnetic data, gravity data, sonobuoy data and dredged rocks. The oceanic basement is confirmed in seismic and gravity data to have a deepening trend and to form a thickening sedimentary basin toward the foot of the continental slope. The maximum depth and thickness exceed 9.0 s in two-way time from sea level and 3.0 s in two-way time between sea bottom and acoustic basement, respectively on seismic lines. The age difference of the oceanic crust is discussed using seismic character difference of the top of acoustic basement. The sediment section of the basin is divided into 3 prominent sequences and discussed in terms of seismic stratigraphy. The heat flow data show slightly lower values than a world ocean average value, and this may suggest that the age of the oceanic basement in this area is relatively old. (Auth.)

J-36730

Locarnini, R.A., Gallardo, G.A., **Data from XBT A.R.A. *Bahía Aguirre* Antarctic Summer Campaign, 1979-1980. First Stage** [Datos de XBT A.R.A. *Bahía Aguirre* Campaña Antártica de Verano 1979/1980. Primera Etapa], *Buenos Aires. Instituto Antártico Argentino. Informe de datos,* Mar. 1987 No.1, 37p., In Spanish with English summary. 6 refs.

Data obtained from 22 drops carried out in Leg 1 of the Antarctic Summer Campaign, 1979-1980, on board the *Bahía Aguirre* are reported. The data were collected on a NW-SE course, between the Falkland Is. and South Georgia, providing information on the thermal structure of the first 450 m of the water column in the area, for determination of the Antarctic Polar Front and the Weddell-Scotia Confluence in krill studies. Tabulated results and charts constitute the bulk of this report.

J-36744

Naqvi, S.W.A., **Some oceanographic observations in the polynya and along a section in the southwest Indian/antarctic ocean,** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.75-85, 30 refs.

Hydrographical and hydrochemical observations have been made at a shelf station off Princess Astrid Coast, Dronning Maud Land, Antarctica, and at 11 other stations along a transect from Antarctica to about 30S latitude. The shelf station, located in a trough, was occupied at 1-month interval in Jan. and Feb. Significant vertical and temporal variations in temperature and salinity are restricted to the upper 200 m; the water is more or less homogeneous below this depth, probably trapped in the trough and renewed by the winter convection. There is some near-surface thermohaline stratification, especially pronounced in Jan. Substantial warming of surface waters occurs from Jan. to Feb., resulting in the melting of ice which reduces the surface salinity. A sub-surface oxygen maximum is observed in Jan. associated with a maximum in primary production. Oxygen concentrations at all depths exhibit decreases from Jan. to Feb. in conjunction with increases in nutrients except phosphate, probably resulting from the oxidation of organic matter following high primary production in Jan. Vertical sections of temperature, salinity, potential density, dissolved oxygen, apparent oxygen utilization, phosphate, nitrate, silicate, pH and alkalinity through Antarctic, subantarctic and subtropical zones are presented and discussed. (Auth. mod.)

J-36781

U.S. Navy. Oceanographic Analysis Division, **Tide tables; high and low water predictions December 1972 through March 1973, McMurdo Sound, Antarctica,** Washington, D.C., U.S. Naval Oceanographic Office, 1972, 6p.

Tidal motions in McMurdo Sound are slow and gentle events with high and low water generally occurring once each day and seldom reaching as much as 2 feet above or below mean water. Predicted tides for Dec. 1972-Mar. 1973 are tabulated and a table showing moon phases for the same period is included.

J-36783

Houry, S., Dombrowsky, E., May, P. de, Minster, J.F., **Brunt-Väisälä frequency and Rossby radii in the South Atlantic,** *Journal of physical oceanography,* Oct. 1987 17(10), p.1619-1626.

Brunt-Väisälä frequency profiles have been calculated in the South Atlantic and neighboring regions on a 5 deg x 5 deg grid between 30N and 70S, 70W and 70E, using the annual mean temperature and salinity profiles computed by Levitus from data available from the National Oceanographic Data Center (NODC). These Brunt-Väisälä frequency profiles are used in the computation of the first and second internal Rossby deformation radii. The external Rossby radius is computed for reference. These results compare very well with earlier computations for the equatorial Atlantic. Very small values of the radii are evidenced in the extreme south (less than 10 km in the Antarctic Circumpolar Current for the first internal mode). High vertical variability in Brunt-Väisälä frequency profiles is also observed at the center of the subtropical gyre. This behavior is probably due to the lack of deep data in this region. (Auth.)

J-36785
Treguer, P., **Comparative physical and chemical characteristics of coastal waters from Kerguelen and Heard islands and their oceanic surroundings during summer; relation to phytoplankton growth,** *Comité National Français des Recherches Antarctiques. CNFRA,* 1987 No.57, Colloque sur l'Ecologie marine des îles subantarctiques et antarctiques, Paris, June 25, 1985, p.17-26, 16 refs.

Physical and chemical characteristics (oxygen, nutrients, dissolved organic matter, trace-metals) are measured in coastal and oceanic waters of Kerguelen and Heard islands during summer. Fertilization mechanisms of these islands' coastal waters and the role played by different physical and chemical factors on phytoplankton growth are discussed. (Auth.)

J-36823
Silva S., N., **Chemical oceanography of the Bransfield Strait: micronutrient compounds (SIBEX-Phase II cruise. Chile),** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.7-37, 18 refs.

For Spanish version and abstract see J-35272.

J-36824
Rojas R., R., **Thermal structure and heat fluxes at Bransfield Strait, 1985,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.35, p.39-63, 14 refs.

For Spanish version and abstract see J-35273.

J-36835
Beckers, C.V., **Currents, water quality, bottom sediments, and bathymetry in McMurdo Sound near McMurdo Station,** *Antarctic journal of the United States,* Dec. 1986 21(4), p.12-14, 6 refs.

The parameters of the title were measured with a view toward replacement of a desalination unit at McMurdo Station. The data are presented and discussed as they may be of interest to other researchers conducting projects in the Sound near the Station.

J-36867
Cherry, M.I., Cherry, R.D., Heyraud, M., **Polonium-210 and lead-210 in antarctic marine biota and sea water,** *Marine biology,* Nov. 1987 96(3), p.441-449, 47 refs.

Concentrations of the naturally-occurring radionuclides Po-210 and Pb-210 were measured in krill *(Euphausia superba),* mesozooplankton, phytoplankton and sea water collected during the South African SIBEX cruise to the Antarctic in autumn 1984. The data reported constitute the first substantial measurements of Po-210 and Pb-210 in such samples in the Antarctic Ocean. The concentrations of Po-210 in mesozooplankton and phytoplankton are unexceptional in comparison with those from other oceans. The SIBEX *E. superba,* however, have higher levels of Po-210 than usually found in euphausiids. The Po-210 data, combined with reasonable estimates of biological quantities such as the fractional assimilation, are used to obtain information about the diet of *E. superba.* It is suggested that the higher Po-210 in the SIBEX *E. superba* reflects a change from an almost entirely phytoplanktonic diet in summer to a more omnivorous diet as winter approaches. The data show that there are allometric relationships between the Po-210 content of euphausiids and animal size; these are discussed briefly. The limited sea-water data presented are characterized by unusually high Po-210:Pb-210 activity ratios and need further investigation. (Auth.)

J-36891
Gordon, A.L., Owens, W.B., **Polar oceans,** *Reviews of geophysics,* Mar. 1987 25(2), p.227-233, Refs. p.232-233.

The progress in studies of ocean circulation, water mass formation, and ocean-ice interaction in both the southern ocean and the Arctic region during the period 1983-86 is surveyed. This review places emphasis on U.S. publications, but other significant work is included. It is not meant to be a complete synthesis of polar oceanography of the last four years, but rather to provide an overview of progress. (Auth.)

J-36902
Nelepo, B.A., Grishin, G.A., Kienko, IU.P., Koval', A.D., **Optical methods of satellite hydrophysics. Environmental investigations from automatic satellites** [Opticheskie metody sputnikovoĭ gidrofiziki. Issledovanie okruzhaiushcheĭ sredy s avtomaticheskikh ISZ], Kiev, Naukova dumka, 1986, 157p., In Russian with abridged English table of contents enclosed. 196 refs.

After discussing technical aspects of studying the ocean in the optical range, methods and means of spaceborne surveys, and processing of video data, satellite observations of large-scale changes in ocean and atmosphere, wave dynamics, and the bio-optical state of the ocean are discussed and illustrated. In the portion describing the large-scale changes in the ocean and atmosphere, the following concerns the Antarctic: the cyclonic surface circulation of the southern ocean waters differs from that in the Northern Hemisphere. A map to that effect is presented of long period averages of global surface currents during the northern winter. Spaceborne data for the period Jan. 8-15, 1983, shows that cyclogenesis covers a period of 7 days, cyclone dimensions vary between 300 and 1200 km, and the speed of motion from 180 to 420 km/day. Upon reaching the coast, the cyclones become stationary. Also presented and discussed is an illustration based on satellite data showing bands of clouds over the Southern Hemisphere for the 1969-1971 period.

J-36991
Foster, T.D., Foldvik, A., Middleton, J.H., **Mixing and bottom water formation in the shelf break region of the southern Weddell Sea,** *Deep-sea research,* Nov. 1987 34(11A), p.1771-1794, 13 refs.

The shelf break region of the southern Weddell Sea was investigated during the period 1977-1980 with sections of closely spaced CTD stations and long-term moored current meters. An intrusion of warmer water onto the shelf from intermediate depths offshore was found in all cross-shelf sections. Evidence that this warmer water intrudes onto the shelf throughout the year was found in the current meter temperature records. Continental shelf waves appear to be the most likely mechanism for bringing this warmer water onto the shelf. Mixing of very cold water on the shelf with the warmer intruded water appears to be promoted by stirring induced by the semidiurnal tides. The mixing also may be directly caused by shear instabilities. Bottom water that forms near the shelf break and flows down the continental slope in the southern Weddell Sea appears to represent a mixture of the cold shelf water with the warmer intruded water and not cold, dense shelf water alone. (Auth.)

J-37008
Venkatesan, M.I., **Diploptene in antarctic sediments,** *Geochimica et cosmochimica acta,* Jan. 1988 52(1), p.217-222, 53 refs.

The presence of diploptene 17beta(H),21beta(H)-hop-22(29)-ene in sediment cores from Bransfield Strait and McMurdo Sound is reported. The organic geochemical data for these sediments provide evidence for the authigenic marine origin of this hopene. (Auth.)

J-37024
Motoi, T., Ono, N., Wakatsuchi, M., **Mechanism for the formation of the Weddell polynya in 1974,** *Journal of physical oceanography,* Dec. 1987 17(12), p.2241-2247, 18 refs.

The formation of the Weddell Polynya is investigated with a one-dimensional, convective mixed-layer model, using *in situ* data from late summer 1974 as initial conditions. It is proposed that a high-salinity mixed layer in summer resulted in the formation of the Weddell Polynya in 1974. The model results show that the high salinity allows deep convection driven by surface cooling alone, and the resulting upward transfer of heat and salt prohibits sea-ice formation throughout the winter, subject to the freshwater input less than 0.4 m/yr. Because of the uncertainty of amount of the actual freshwater input in 1974, whether sea ice formed is ambiguous. However, the occurrence of the deep convection during the 1974 polynya formation is confirmed by summer data from 1975, showing the modification of deep water to be colder, fresher and richer in oxygen than in 1974. The upward heat flux through the deep convection resulted in the formation of the Weddell Polynya in 1974. (Auth.)

J-37061
Mikhaĭlovskiĭ, IU.A., Mikhal'tseva, T.V., **Hydrochemical studies in the Riiser-Larsen, Cosmonauts', and Commonwealth seas,** *Oceanology,* Apr. 1987 26(5), p.592-593, Translated from Okeanologiia 26(5), 1986. 2 refs.

During Jan.-Mar. 1984, the 22nd SAE carried out interdisciplinary investigations in the southern Indian Ocean sector gathering data at about 200 stations. The stations were placed mainly on meridional sections to a depth of 1200 m or to the seafloor in shallower depths; the extreme northern stations were located at 59.5-60S, and the extreme southern stations on the edge of the drifting ice. The expedition examined the distribution of the hydrochemcial characteristics of dissolved oxygen, phosphates, nitrates, nitrites, and silica. Data were obtained for the first time on organic phosphorus. (Auth. mod.)

J-37141
Guretskiĭ, V.V., **Surface thermal fronts in the Atlantic sector of the southern ocean,** *Soviet meteorology and hydrology,* 1987 No.8, p.67-73, Translated from Meteorologiia i gidrologiia. 15 refs.

Based on historical data on the surface temperature of the ocean in cross sections, the position of thermal fronts and their statistical characteristics in the Atlantic sector of the southern ocean were determined. It is shown that the main thermal fronts (Subtropical, Subantarctic, and Arctic Polar) are tracked throughout the entire sector, and the fronts are expressed much more clearly in the western area of the sector than in the central and eastern areas. Comparison with results of diagnostic calculations of currents shows that the Subantarctic and Antarctic Polar fronts are confined respectively to the northern and southern streams of the Antarctic Circumpolar Current (ACC), which has a two-stream structure in most of the sector. (Auth.)

J-37172
Lukowski, A.B., Ligowski, R., **Cumulation of chloroorganic insecticides by antarctic marine diatoms,** *Polish polar research,* 1987 8(2), p.167-177, 11 refs.

In summer 1983-1984 samples of planktonic and attached diatoms were collected in the Admiralty Bay as well as in the region of South Orkneys, Drake Passage and Bransfield Strait. Using gas chromatography, residues of chloroorganic pesticides namely the compounds of the DDT group and HCH isomers, were determined. It was found that the highest values of the content of these compounds occurred in attached diatoms coming from areas continuously washed with water from the melting glacier, in planktonic diatoms from the samples of the Admiralty Bay and from strongly glaciated regions. The hypothesis is put forward that, along with the direct atmospheric transport, the release of the deposits of these compounds from ice and glaciers during their melting is an additional source of input of chloroorganic biocides into antarctic waters. Diatoms are good indicators of this process. (Auth.)

J-37258
Holloway, G., **Systematic forcing of large scale geophysical flows by eddy-topography interaction,** *Journal of fluid mechanics,* Nov. 1987 Vol.184, p.463-476, 30 refs.
DLC QA901.J87

The interaction of eddies with variations in topography, together with a tendency for large-scale wave propagation, generates a systematic stress which acts upon large-scale mean flows. This stress resists the midlatitude tropospheric westerlies, resists the oceanic Antarctic Circumpolar Current, and may be a dominant mechanism in driving coastal undercurrents. Associated secondary circulation provides a systematic upwelling in coastal oceans, pumping deeper water onto continental shelf areas. The derivation rests in turbulence closure theory and is supported by numerical experiments. (Auth.)

J-37280
Hodgkinson, R.P., Colman, R.S., Kerry, K.R., Robb, M.S., **Water currents in Prydz Bay, Antarctica during 1985,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Mar. 1988 No.59, 127p., 2 refs.

Four moorings were deployed in Prydz during 1985 to collect information at four depths at four sites on water speed, direction, temperature, and in some cases, conductivity. The reduced data and notes on the data acquisition methods and locations are presented. Some initial comments on the characteristics of the data are given and some speculation on the implications of the data is included. An initial description of the physical oceanography of Prydz Bay provided the first input to a database of sufficient intregrity and quantity for numerical modelling purposes. (Auth.)

J-37281
Anderson, J.B., Domack, E.W., **USAP 1988 Cruise III, RV *Polar Duke* cruise report,** [1988], 22 leaves.

USAP Cruise III of *Polar Duke* began Dec. 22, 1987 and had two major goals: to investigate sedimentation in the fiords along the continental shelf on the western side of the Antarctic Peninsula, and to conduct a seismic and coring survey on the shelf between 68W and 63W. Specific tasks included: search for evidence of prior episodes of glacial waxing and waning; examine tectonic and sedimentological evolution; collect a closely spaced set of seismic reflection lines; test current models for glacimarine sedimentation; acquire a suitable sedimentary record related to Holocene climatic variation; gain insight on sedimentation processes in fiords. Results of these endeavors are presented and discussed.

J-37282
Keffer, T., Holloway, G., **Estimating southern ocean eddy flux of heat and salt from satellite altimetry,** *Nature,* Apr. 14, 1988 332(6165), p.624-626, 16 refs.

An outstanding problem in the oceanic and atmospheric sciences is the rate of heat and fresh water transport from the equator to the poles, for it is this transport which powers the Earth's weather and climate system. Closing the Southern Hemisphere balances has proven particularly difficult because of the dominance of eddy fluxes across the Antarctic Circumpolar Current. Their relatively small space, but long time scales, make any *in situ* measurement program prohibitively expensive. Satellite data was used to estimate the overall eddy activity and a turbulence closure scheme to relate this to eddy flux. The resulting estimated heat flux is sufficient to supply the heat lost to the atmosphere south of the Antarctic Polar Front. Estimated salinity flux is found to be poleward at high latitude—in the

wrong direction to compensate for the observed excess of precipitation over evaporation south of the Polar Front. (Auth.)

J-37283

De Szoeke, R.A., **Heat flux in the Antarctic,** *Nature,* Apr. 14, 1988 332(6165), p.585-586, 9 refs. For the item being commented on see J-37282.

Comments are made critiquing the theory of Keffer and Holloway on eddy flux in the southern ocean. They are commended for pointing out the usefulness of satellite measurements in their theory but arbitrary adjustments in the model are questioned. More detailed results over a longer time span are needed to test the validity of the model.

J-37309

Van Ypersele, J.P., **Numerical study of the response of the southern ocean and its sea ice to a CO2-induced atmospheric warming,** *National Center for Atmospheric Research. Cooperative thesis,* 1986 NCAR/CT-99, 135p., PB87-163218, Refs. p.110-135.

A comprehensive coupled model of ocean circulation and sea ice has been developed to study a selected area of the southern ocean that includes the Weddell Sea and the Drake Passage. An existing general circulation model of the ocean was configured for the geometry of the southern ocean domain and then improved by including robust-diagnostic forcing and allowing for coupling to a sea-ice model. When the model was initially tested without coupling, the ocean circulation corresponded well with the observed circulation. In addition, a dynamic-thermodynamic model of sea ice was developed and tested with a constant upward oceanic heat flux. (Auth. mod.)

J-37345

Miller, D.G.M., **South African SIBEX II cruise to the Prydz Bay region, 1985: cruise description and preliminary review of results,** *South African journal of antarctic research,* 1987 17(2), p.105-111, With Afrikaans summary. 22 refs.

South Africa's participation in SIBEX II in the south Indian Ocean (48-64E) during Feb.-Mar. 1985 is summarized. The two basic objectives of the cruise were to provide a temporal comparison of oceanology in the region with earlier results from an Australian survey and to undertake meso/fine-scale studies of various processes associated with krill *(Euphausia superba)* swarm dynamics. Unfortunately, survey work had to be prematurely curtailed as a result of rudder damage to the ship the R/S *Africana.* A review of data collected is given and an attempt is made at their interpretation. (Auth.)

J-37372

Workshop to Develop Scientific Ocean Drilling Initiatives in the South Atlantic and Adjacent Southern Ocean, **Summary report,** Woods Hole, MA, 1987, 60p., Refs. p.57-60.

Goals of the workshop were to develop suites of drilling objectives in the South Atlantic by stressing themes and to broaden the base of expertise on which ocean drilling programs rest. Areas of the antarctic waters are included in the discussions as regions mainly yet unknown but recognized as highly influential on other areas of the world. Major discussion groups were aligned on the topics of evolution of oceanic lithosphere/tectonics; biostratigraphy; physical stratigraphy/sedimentary record; and geochemistry. Summaries of the deliberations of these discussion groups are presented.

J-37373

Husby, D.M., Muench, R.D., **Hydrographic observations in the northwestern Weddell Sea marginal ice zone during March 1986,** *U.S. National Oceanic and Atmospheric Administration. NOAA technical memorandum NMFS,* Jan. 1988 NOAA-TM-NMFS-SWFC-106, 33p., PB88-173 240, 7 refs.

Temperature and salinity observations were made from the surface down to 1500 m to sample the 3 water masses characterizing the region. The uppermost, Surface Water, layer extended to 30-50 m, had temperatures from near freezing (-1.8 C) up to about 0 C and salinities of 33-34 ppt. A layer of Weddell Winter Water underlay the Surface Water, extending to about 100 m, and had temperatures of -1.5 to -1.7 C and a salinity of about 34.46 ppt. The Weddell Warm Deep Water extended from the bottom of the Winter Water to more than 1500 m, displaying temperature increasing with depth to a maximum of about 0.5 C near 500 m then decreasing to 1500 m. Salinity increased with depth in this layer to about 34.67 ppt near 500 m, then decreased slightly at greater depths. A warm core having temperatures greater than 0.5 C was present near 500 m depth in the westernmost part of the study region. The temperature maximum region within the Warm Deep Water decreased in depth eastward, toward the center of the gyre, within this core. The baroclinic circulation, expressed as dynamic topography of the surface relative to the 1500 db level, was insignificant throughout the region. (Auth.)

J-37375

Guretskiĭ, V.V., Danilov, A.I., Ivchenko, V.O., Klepikov, A.V., **Modelling the southern ocean circulation** [Modelirovanie tsirkuliatsii IUzhnogo okeana], Leningrad, Gidrometeoizdat, 1987, 199p., In Russian with English summary. 200 refs.

The 4 chapters of this book review the extensive literature dealing with the nature and modelling of the southern ocean circulation. Results of diagnostic modelling of ocean circulation are discussed. The parameterization of eddy transfer processes related to synoptic eddies is formulated, and the results of numerical experiments with zonal-average and quasi-geostrophic models, using that parameterization, are analyzed. (Auth. mod.)

J-37381

Nowlin, W.D., Jr., Zenk, W., **Westward bottom currents along the margin of the South Shetland Arc,** *Deep-sea research,* Feb. 1988 35(2A), p.269-301, 36 refs.

Existing information is synthesized and new data presented to describe the flow of near-bottom water from the Weddell Sea into the Scotia Sea and westward through Drake Passage along the continental slope. The water characteristics and currents along the northern margins of the South Sandwich Island Arc are examined. Long-term current measurements in the bottom waters at locations over the outer shelf and slope and along the continental rise show persistent flow from Atlantic to Pacific along isobaths at speeds of 10-20 cm/s. Three sources for the waters in these currents are identified and discussed. At the deepest levels, Weddell Sea Deep Water enters the Scotia Sea near 40W through a depression in the South Scotia Arc and then flows westward, constrained by the bottom topography. Mid-depth waters may flow from the Weddell Sea to the Scotia Sea through the Powell Basin, sill depth approximately 200 m. The westward flowing waters along the shelf and upper continental slope, which are denser than those immediately offshore, may be a continuation of the Polar Slope Current from the Weddell Sea or may be derived principally by convection from the shelves of the South Sandwich Island Arc. A vertical section north of Elephant I. shows downslope convection off the shelf, analogous to that observed at many locations around Antarctica. (Auth.)

J-37423
Titus, J.G., **Causes and effects of sea level rise,** North American Conference on Preparing for Climate Change, 1st: a Cooperative Approach, Washington, D.C., Oct. 27-29, 1987. Proceedings, Rockville, MD, Government Institutes, Inc., Apr. 1988, p.125-139, Refs. p.136-139.

An overview of the causes and effects of the projected rise in sea level from the greenhouse effect is presented. In listing the causes, a brief description of the antarctic ice sheet—with its vulnerability to climatic changes—as a source for the higher sea level is given.

J-37454
Fukuchi, M., Hattori, H., **Surface water monitoring system installed on board the icebreaker *Shirase*,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.47-55, 8 refs.

A surface water monitoring system was designed and installed on board the icebreaker *Shirase*. The system consists of sensors unit, navigation information terminal and control unit. Water pumped up from an intake of hull (8 m depth) is led into the sensors unit so as to measure flow rate of water, water temperature, conductivity, dissolved oxygen, fluorescence intensity, size composition of plankton and concentration of nutrient salt. Analog signals from these sensors as well as digital data from navigation information terminal (GMT, position, ship's speed, sea depth, water and air temperature) are transferred into the contorl unit at intervals of every five minutes. All data are stored on a floppy disk mounted in the control unit simultaneously. A post data processing system enables data editing, graphic displaying of time series data and geographical mapping. A field experiment in JARE-27 (1985/86) to the antarctic ocean revealed the usefulness of the present system for detecting fine-micro scale temporal and spatial variations of phytoplankton in relation to the oceanographic variables. (Auth.)

J-37466
Naganobu, M., **Vertical distributions of temperature, salinity and geostrophic flow along 155E and 170W in the southern ocean in December 1968-February 1969,** NIPR Symposium on Polar Biology, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.217-218, Extended abstract.

Maps and charts showing vertical distributions of temperature, salinity and geostrophic flow, from 35S to the continental shelf of Antarctica along 155E and 170W, are presented. There are large differences in macro-scale oceanic environments between the Atlantic, Indian and Pacific Ocean sectors.

J-37509
Lutjeharms, J.R.E., Shannon, L.V., Beekman, L.J., **On the surface drift of the southern ocean,** *Journal of marine research,* May 1988 46(2), p.267-279, 32 refs.

Drift rates of the sea surface have been calculated for the South Atlantic and South Indian Ocean sectors of the southern ocean using drift cards and FGGE buoys. Drift patterns and drift rates, based on results from 40,000 plastic drift cards placed from 1978 to 1981, indicate significant equatorward surface exchange between the Southern Ocean and subtropical ocean gyres. Card drift rates increase with latitude up to the 40-45S zone. Average zonal drift rates lie between 10.3 cm/s and 16.4 cm/s. Zonally averaged drift rates of FGGE buoys are also at a maximum between 40 and 45S but are 15% higher; lowest rates are 12.2 cm/s. Significant differences in the drift rates between sectors of the same zone reflect the influence of bottom topography. (Auth.)

J-37518
Peltier, W.R., **Lithospheric thickness, antarctic deglaciation history, and ocean basin discretization effects in a global model of postglacial sea level change: a summary of some sources of nonuniqueness,** *Quaternary research,* Mar. 1988 29(2), p.93-112, 38 refs.

The global model of postglacial relative sea level variations that has been developed over the past decade is employed to investigate the constraints that it may be invoked to place on the timing of the deglaciation of West Antarctica. A large number of Southern Hemisphere relative sea level data are shown to require that the retreat of antarctic ice substantially lagged the retreat of Northern Hemisphere ice if the deglaciation of Antarctica was abrupt. The time of onset of the antarctic deglaciation is thereby shown to coincide with the time of most rapid Northern Hemisphere deglaciation. Sensitivity tests are performed which demonstrate that this result is relatively insensitive to the discretization employed to represent the ocean basins; the only exception to this general rule obtains at some coastal sites at which a trade-off is revealed between the delay of west antarctic melting and the thickness of the lithosphere required to reconcile the observed local variations of relative sea level. At such sites, which are all in the far field of the ice sheets, some attention must be paid to the accuracy of the local finite element representation of the oceans and to details of antarctic deglaciation history. (Auth.)

See also:
A-35247 A-35685 B-34798 B-34888 B-34904 B-35225 B-35227 B-35228 B-35356 B-35358 B-35359 B-35360 B-35361 B-35362 B-35363 B-35365 B-35366 B-35367 B-35370 B-35371 B-35372 B-35373 B-35380 B-35416 B-35419 B-35423 B-35456 B-35585 B-35654 B-35655 B-35656 B-35659 B-35669 B-35670 B-35716 B-35726 B-35730 B-35731 B-35744 B-35760 B-35851 B-35856 B-35863 B-35867 B-35930 B-36009 B-36115 B-36240 B-36248 B-36274 B-36275 B-36278 B-36281 B-36325 B-36380 B-36460 B-36564 B-36577 B-36618 B-36688 B-36689 B-36732 B-36766 B-36784 B-36788 B-36855 B-36894 B-37040 B-37220 B-37221 B-37223 B-37224 B-37225 B-37227 B-37252 B-37292 B-37340 B-37380 B-37464 D-35345 D-35947 D-36462 D-36984 E-34774 E-34898 E-34924 E-34925 E-35059 E-35060 E-35068 E-35166 E-35335 E-35336 E-35355 E-35449 E-35468 E-35516 E-35769 E-35776 E-35898 E-36178 E-36217 E-36372 E-36383 E-36415 E-36756 E-37025 E-37208 E-37322 E-37520 E-37521 E-37522 F-34841 F-34900 F-35252 F-35351 F-35353 F-35395 F-35420 F-35438 F-35515 F-35715 F-35802 F-35874 F-35875 F-35934 F-36008 F-36341 F-36499 F-36515 F-36614 F-36626 F-37064 F-37177 F-37313 F-37370 I-34874 I-35478 I-35813 I-35941 I-35942 I-36442 I-36496 I-36655 I-36660 I-36883 I-36950 I-37003 I-37074 I-37108 I-37201 I-37308 L-34949 L-36170 L-36304 L-36370 L-37508 M-36570

K. ATMOSPHERIC PHYSICS

K-34682
Rodger, A.S., Cowley, S.W.H., **Observations of the effects of DPY currents at sub-auroral latitudes,** *Planetary and space science,* Jan. 1986 34(1), p.41-45, Refs. p.44-45.

Magnetograms from Lerwick, Scotland and Halley, Antarctica are used to show that the effects of the DPY current system can frequently be detected at these sub-auroral observatories. It is found that the magnetic perturbations associated with the DPY current dominate any effects that may be caused by the dawn-dusk displacement of the DP2 current resulting from the imposition of the *y*-component of the interplanetary magnetic field, *By*. The magnitude of the DPY current effect appears to be directly related to that of *By*, which is contrary to results from stations within the polar cap. There is no apparent seasonal variation in the frequency with which DPY effects are seen at Halley and Lerwick. (Auth.)

K-34688
Igarashi, K., **Solar-terrestrial disturbances of June-September 1982. 4. Ionospheric disturbances. 13. Aurora observation using the Syowa Station 50-MHz Doppler radar,** *Radio Research Laboratory, Tokyo. Journal,* Mar. 1986 33(Special Issue No.1), Solar-terrestrial disturbances of June-Sep. 1982, p.269-277, 13 refs.

A new 50-MHz Doppler radar with a mini-computer for real-time data processing and radar control was installed at Showa Station in Feb. 1982. Severe geomagnetic disturbances occurred at about 00 h UT, 14 July 1982. A magnetic *H* component decrease of about 4200 nT was observed at Showa Station, and one of about 630 nT at Kakioka Magnetic Observatory. 50-MHz backscatter echoes were received on 13-14 July 1982 during a substorm growth phase; the rough estimates of the Doppler velocity during this period were obtained. Doppler spectra are discussed in the following 3 stages: SSC onset, substorm main phase and recovery phase. On the hypothesis of spatially homogeneous plasma flow, a large-scale electric field was determined by combining the drift velocities along the radar beams. It appeared that the *E* region electric field was larger than 30 mV/m in the main phase of this substorm. (Auth.)

K-34710
Rodger, A.S., Brace, L.H., Hoegy, W.R., Winningham, J.D., **Poleward edge of the mid-latitude trough—its formation, orientation and dynamics,** *Journal of atmospheric and terrestrial physics,* Aug. 1986 48(8), p.715-728, 55 refs.

Data from the advanced Ionospheric Sounder (AIS) deployed at Halley and the Dynamics Explorer-2 spacecraft (DE-2) are used to investigate several aspects of the formation processes and dynamics of the polcward edge of the mid-latitude electron density trough. These include a study of the flux and energy of charged particles precipitating into the *F*-region as a function of Magnetic Local Time. Local energetic electron precipitation is a major source of ionization of the poleward edge in the evening sector, but after magnetic midnight transport processes become more important. Occasionally a significant increase in the flux of conjugate photo-electrons is colocated with the poleward edge of the trough in the morning sector. Some possible mechanisms are discussed but no firm conclusions are drawn. A comparison of the equatorward motion of the poleward edge on many nights is used to show that *Kp* is a poor index to use in any empirical model for predicting the temporal variations of the location of the trough. (Auth. mod.)

K-34911
Lanzerotti, L.J., **Possible evidence of flux transfer events in the polar ionosphere,** *Geophysical research letters,* Nov. 1986 13(11), p.1089-1092, 27 refs.

Magnetic field data from the cusp-latitude South Pole Station are presentcd. These exhibit, under appropriate local time and interplanetary magnetic field conditions, the signature expected in the ionosphere from a flux transfer event (FTE) at the magnetopause. In particular, the model of multiple X-line reconnection at the magnetopause predicts field-aligned currents in helical flux tubes, with transverse magnetic fields propagating as Alfvén waves toward the ionosphere. The distinctive magnetic signature at a polar cap magnetic station, particularly in the vertical component, can be used to infer the signs of the B(y) and B(z) components of the interplanetary magnetic field. (Auth.)

K-35087
Mansurova, L.G., **Catalog of interplanetary magnetic field sector polarity, 1981-1982** [Katalog opredeleniĭ poliarnosti sektorov mezhplanetnogo magnitnogo polia za period 1981-1982 gg], *Antarktika; doklady komissii,* 1984 No.23, p.176-183, In Russian. 9 refs.

DLC G576.A65

Determinations of predominant polarity of interplanetary magnetic field sectors from 1981 to 1982, recorded daily and categorized by the type of geomagnetic field variations at polar stations, are summarized in charts. A brief description of the sector structure of the IMF is included.

K-35089
Maslanyj, M.P., Damaske, D., **Lessons regarding aeromagnetic surveying during magnetic disturbances in polar regions,** *British Antarctic Survey. Bulletin,* Nov. 1986 No.73, p.9-17, 8 refs.

During aeromagnetic surveying in high geomagnetic latitudes problems of severe (>100 nT) diurnal magnetic disturbances are experienced. The effect is assessed of the diurnal variations on the aeromagnetic records, recorded in the Martin Hills (geomagnetic latitude 70.56, geomagnetic longitude 6.2) West Antarctica. The diurnal records are compared with global disturbance patterns and data from the geomagnetic observatory at Halley (geomagnetic latitude 66.2, geomagnetic longitude 26.5). The results demonstrate the limitations of operating at such latitudes and suggests that base stations monitoring diurnal variation should be within at least 100 km of the survey area. The effect of the diurnal disturbances can be reduced by restricting flights to the daily quiet magnetic periods which are predictable. (Auth.)

K-35129
Gledhill, J.A., **Magnetospheric substorm observed at Sanae, Antarctica,** *Journal of geophysical research,* Mar. 1, 1987 92(A3), p.2461-2475, 36 refs.

A magnetospheric substorm that occurred at Sanae, Antarctica, on July 27, 1979, was observed by a variety of techniques. A synthesis of the observations is presented, and an attempt made to deduce details of the behavior of the magnetosphere-ionosphere system during the cvent. While there was some evidence of a growth phase, it was inconclusive. At the onset there was a rapid change in the tail field, which assumed a more dipolar form, accompanied by Pi 2 oscillations and the precipitation of 6-keV electrons, with brightening of

the auroral arc, auroral-type sporadic *E* ionization, and riometer absorption. A positive spike was observed in the *D* magnetic component, instead of the expected negative one. There was no evidence of the usual westward traveling surge at the beginning of the expansion phase during which the precipitation region, auroral arc, and electrojet moved rapidly poleward, though it may have occurred outside the field of view from Sanae. The *Hbeta* emission increased by a factor of less than 2, whereas the oxygen and nitrogen emissions monitored increased by 3-4. During the recovery phase, phenomena were consistent with a return of the tail field to an elongated form; a very high ratio of 557.7-nm/630-nm emissions, exceeding 10, was observed; and the electrojet lagged noticeably behind the photon emission regions. (Auth.)

K-35136

Nekrasov, B.IU., **Comparison of experimental and computed long-range oblique-sounding ionograms on the Moscow-Molodezhnaya (Antarctica) path,** *Geomagnetism and aeronomy,* 1984 [Pub. 1985] 24(4), p.494-498, 12 refs., Translated from Geomagnetizm i aeronomiia.

DLC QC811.G383

Averaged typical ionograms of distant oblique-incidence sounding were obtained for Mar. 1979 over the extended path Moscow-Molodezhnaya Station by the method of graphic superposition of experimental ionograms. Ionograms were also calculated by the adiabatic method with the use of the global analytical equinoctial model of electron density of the ionosphere, EMI-81. A comparison of the ionograms is conducted. The calculations show that the EMI-81 model, on the average, reflects the regularities of the ionospheric plasma distribution.

K-35137

Lazarev, A.I., Kovalenok, V.V., Evlashin, L.S., **Observations of polar aurorae from onboard the Salyut-6 orbital scientific station during the large geomagnetic storm of April 11-13, 1981,** *Geomagnetism and aeronomy,* 1984 [Pub. 1985] 24(4), p.507-510, 14 refs., Translated from Geomagnetizm i aeronomiia.

DLC QC811.G383

The results of an analysis of visual observations of polar aurorae in the Southern Hemisphere onboard the Salyut-6 orbital scientific station during the large geomagnetic storm of April 11-13, 1981, are discussed. Schematic maps of the regions of emission of polar aurorae above the surface of the earth are constructed from these data.

K-35138

Bol'shakova, O.V., Troitskaia, V.A., **Relation of the high-latitude maximum of Pc3 intensity to the dayside cusp,** *Geomagnetism and aeronomy,* 1984 [Pub. 1985] 24(5), p.633-635, 8 refs., Translated from Geomagnetizm i aeronomiia.

DLC QC811.G383

The meridional distribution of the amplitude of Pc3 in the region of high latitudes is investigated. It is shown that the maximum of the Pc3 amplitude coincides with the position of the dayside cusp and moves upon a change in the magnetic activity according to the change of the cusp position. Stations whose data was used in this study are located in the immediate vicinity of the southern geomagnetic pole (Vostok Station), in the region of projection of the dayside polar cusp (Mirnyy Station), in the auroral zone (Molodezhnaya Station and Novolazarevskaya Station), and in the subauroral zone (Kerguelen Island).

K-35241

Cazeneuve, H., Grinspon, M., Tabocchini, H., **Collective geomagnetic response in several antarctic stations,** *Revista de geofisica,* 1984 40(1), p.53-64, 13 refs.

Data from 6 antarctic stations were analyzed in search of an ordered structure in the geomagnetic variations previously observed at Belgrano Station. Results of cross-correlation and interspectral analysis provide conclusive evidence of a collective response in the ensemble of stations, when the magnetic activity is excited. Conditions of linearity of the coherency analysis implies in turn that in the disturbed epochs a similar energy distribution does exist over an extended area of Antarctica. This area should be homogeneously disturbed, producing a high by correlated and spatially coherent pattern of activity at the involved stations. Finally, the interspectral analysis provides a further characterization of the medium in which the signals propagate, since some bands of frequency with a high coherency level persist over prolonged periods. These frequencies can be considered an invariant characteristic of the medium. (Auth.)

K-35269

Iribarren B., M., Figueroa F., C., **Installation of ionosonde at the ionospheric station Teniente Marsh** [Instalación de un ionosonda para la estación ionosférica de Base Teniente Marsh], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.99-103, 4 refs., In Spanish with English summary.

The positioning of an ionosonde IPS-42 at the ionospheric station Rodolfo Marsh in Feb. 1986 is discussed. The ionosonde characteristics, and those of its associated antennas, are described, as is the process of collection of data which are stored in the VAX-780 computer at the Universidad de Concepción, Chile. Ionograms are presented showing different ionospheric stratifications. (Auth. mod.)

K-35282

Inan, U.S., Carpenter, D.L., **Lightning-induced electron precipitation events observed at *L* approx 2.4 as phase and amplitude perturbations on subionospheric VLF signals,** *Journal of geophysical research,* Apr. 1, 1987 92(A4), p.3293-3303, 29 refs.

In 1983, the phase and amplitude of signals from the NPM transmitter in Hawaii (23.4 kHz) and the Omega transmitter in Argentina (12.9 kHz) were measured at Palmer Station, together with the magnetospheric whistler background. The long baseline and over-sea great circle paths from these two sources make it possible for the observed perturbations to be interpreted using a single waveguide mode theory. Analytical expressions are used to relate the magnitude of the phase perturbations to differential changes in ionospheric reflection height along a segment of the propagation path. The predicted relationship between relative perturbation sizes on the two different signals is compared with measurements. From this information, the range of whistler-induced flux levels and the shape of precipitation regions are inferred. (Auth. mod.)

K-35283

Carpenter, D.L., Inan, U.S., **Seasonal, latitudinal and diurnal distributions of whistler-induced electron precipitation events,** *Journal of geophysical research,* Apr. 1, 1987 92(A4), p.3429-3435, 11 refs.

Whistler-induced electron precipitation events have been studied by means of data sets acquired in 1982-1983 at Palmer and Siple stations. The data sets confirm previous indications of a broad maximum in hourly event occurrence rates. The peak was centered approx 1-2 hours after local midnight at Palmer for the roughly north-south Argentina Omega 12.9-kHz path, but shifted several hours later for the 23.4-kHz NPM path, which has a westerly arrival bearing at Palmer. The previously reported seasonal variation, with peaks at the equinoxes, was confirmed; activity persisted in the austral winter, particularly following a magnetic storm, but in general occurred on fewer days and during shorter daily periods. Comparisons of occurrence data at Siple and Palmer for particular signal sources showed the

number of days of activity to be larger at Palmer by a factor of 2 or more. Comparisons of five months of simultaneous Palmer and Siple receptions of 21.4-kHz NSS signals on north-south paths suggest that most of the events observed at Siple occurred as the result of ionospheric perturbations relatively close to the *L* shell of Palmer. (Auth. mod.)

K-35301

Sergeeva, N.G., **Radio auroral observations at the daytime cusp,** *Geomagnetism and aeronomy,* [Jan./Feb.] 1983 (Pub. Aug. 1983) 23(1), p.120-122, 11 refs., Translated from Geomagnetizm i aeronomiia.

DLC QC811.G383

On the basis of experimental data on a radio aurora in the daytime cusp, its behavior is described as observed at Mirnyy Station, in different seasons and in relation to different signs of the Bz- and By-components of the interplanetary magnetic field (IMF). It is demonstrated that the origin of radio auroras in the daytime cusp is strongly dependent upon the components of the IMF, reaching a probability of 0.7 at $Bz>0$ and $By<0$. In a series of cases when $By<0$ and $Bz>0$, small time intervals (about 15 min) are present when radio auroras are not recorded. The radio auroras occur in all seasons of the year, but in a number of cases the radio reflections decrease from winter to summer. The region of radio aurora recording is displaced by 2-3 deg toward the pole.

K-35302

Pakhomov, S.V., Neelev, I.O., Kniazev, A.K., **Effect of the winter D region anomaly on measurements on Kerguelen Island,** *Geomagnetism and aeronomy,* [Mar./Apr.] 1983 (Pub. Oct. 1983) 23(2), p.244-246, 5 refs., Translated from Geomagnetizm i aeronomiia.

DLC QC811.G383

In order to study the winter features for electron cencentration variations in the *D* region of the Southern Hemisphere, measurements were made in May-July 1981 on Kerguelen I. of the ne(h) profile and the atmospheric temperature and wind. Data obtained under quiet geomagnetic conditions were selected for the analysis of experimental material. The value of the local aggregate daily *K*-index was utilized. The possible reason for the deviation of the July 8 profile is considered from the general correlation picture. The experimental data presented illustrate several characteristics of the winter anomaly phenomenon in the Southern Hemisphere and the relation of the ne variations in the winter period to the meteorological processes in the middle atmosphere.

K-35303

Bol'shakova, O.V., Troitskaia, V.A., Zaĭtsev, A.N., **Diagnostics of the dayside cusp with northern direction of the interplanetary field according to the data of a chain of automatic magnetic variation stations in Antarctica,** *Geomagnetism and aeronomy,* [May/June] 1983 (Pub. Dec. 1983) 23(3), p.416-417, 3 refs., Translated from Geomagnetizm i aeronomiia.

DLC QC811.G383

The diagnostics of the position of the dayside cusp were based on data obtained from a chain of automatic magnetic variation stations (AMVS) located in Antarctica from Mirnyy to Vostok stations. Days with maximally low activity were selected, on which B2 of the interplanetary field was greater than 0, during May-June 1975. In this case the cusp is shifted towards the pole, and for large positive B2 it can even reach the near-polar region. The diurnal variations of the *ipcl* amplitude from the five automatic stations, and from Mirnyy Station, are presented. It is pointed out that a chain of stations with a spacing about 1 deg offers the possibility not only of determining the position of the cusp but also of investigating the fine structure of its motion upon a variation of the solar-wind parameters and determining directly the width of the cusp projection itself. The position of the cusp under identical conditions is compared in the Northern and Southern Hemispheres, with the conclusion that the seasonal shift of the position of the dayside cusp does not depend on the level of magnetic activity if the difference between the simultaneous positions of the cusp in both hemispheres is assumed to be caused only by the difference in the seasons.

K-35304

Papitashvili, V.O., Zaĭtsev, A.N., Fel'dsteĭn, IA.I., **Magnetic disturbances generated by the interplanetary magnetic field in the southern polar cap during the summer,** *Geomagnetism and aeronomy,* [July/Aug.] 1983 (Pub. Feb. 1984) 23(4), p.506-509, 9 refs., Translated from Geomagnetizm i aeronomiia.

DLC QC811.G383

A regression analysis of the coupling between the components of the geomagnetic field vector at the Mirnyy Station and 8 autonomous magnetic variation stations, positioned at the polar cap of the Southern Hemisphere, and the components of the interplanetary magnetic field (IMF) vector for four summer months (1978-1979) is performed. The equivalent current vectors, reflecting the coupling between the variations of the geomagnetic field and the changes in the By and Bz components of the IMF, and variations of the field independent of the IMF are constructed. It is found that the equivalent current systems in the southern polar cap, coupled to the IMF, have their own peculiarities, not previously noted in studying data for the Northern Hemisphere. (Auth.)

K-35305

Besprozvannaia, A.S., Shirochkov, A.V., Shchuka, T.I., **Spatial distribution of anomalous phenomena in the southern high-latitude winter ionosphere from earth-based data,** *Geomagnetism and aeronomy,* [Nov./Dec.] 1983 (Pub. June 1984) 23(6), p.756-759, 17 refs., Translated from Geomagnetizm i aeronomiia.

DLC QC811.G383

Maps are constructed for the high solar activity winter months, the frequency at which *Es* ionization appears, the auroral *E* and auroral absorption frequencies, and the distribution of *F2*-layer critical frequencies in the Southern Hemisphere, making use of the conjugation principle in the closed field-line region, and antarctic ionospheric sounding data in the polar cap region. It is concluded that the regularities of behavior of anomalous phenomena derived for the Northern Hemisphere are also generally valid for the Southern Hemisphere. Significant discrepancies can only be seen at the polar caps, where the interplanetary magnetic field takes on a definite value. (Auth.)

K-35405

Gaines, E.E., **Correlated electron and X ray measurements of quiet time electron precipitation: a comparative study of bremsstrahlung production and transport in the atmosphere,** *Journal of geophysical research,* Dec. 1986 91(A12), p.13,455-13,462, 18 refs.

Five cases of X ray observations from balloons coordinated with measurements of precipitating electrons were obtained during passes of the polar-orbiting satellite P78-1 near Siple Station, the launch point of the balloons. The observations, made during a geomagnetically quiet period in late Dec. 1980 to early Jan. 1981, showed small enhancements of the X ray fluxes ($E>25$ keV) and moderate trapped electron fluxes ($E>68$ keV) with pitch angle distributions extending into the edge of the loss cone sufficient to produce the <0.5 dB of cosmic noise absorption recorded by the Siple 30-MHz riometer. Bremsstrahlung production and transport in the atmosphere were calculated using the measured electron fluxes, energy spectra, and pitch angle distributions for the source. The X ray fluxes and spectra cal-

culated for the balloon altitudes were in good agreement with those measured from the balloons. The observed electron fluxes show that a significant continuous electron precipitation occurs at the western edge of the South Atlantic magnetic anomaly even at times of low geomagnetic activity. (Auth.)

K-35406

Tolstoy, A., Rosenberg, T.J., Inan, U.S., Carpenter, D.L., **Model predictions of subionospheric VLF signal perturbations resulting from localized, electron precipitation-induced ionization enhancement regions,** *Journal of geophysical reseach,* Dec. 1, 1986 91(A12), p.13,473-13,482, Refs. p.13,481-13,482.

This study uses a waveguide mode theoretic propagation model to predict the effect of localized ionization enhancement D regions on nighttime long-path VLF signals from the U.S. Navy navigational transmitters NSS, NAA, NLK and NPM to antarctic receiving stations, principally the U.S. station at Palmer. These predictions are then compared with the observed signal behavior in Trimpi events from which inferences can be drawn about a D regions's approximate location, size, and particle characteristics. The propagation model considers multiple modes, variable ground conductivity, and mode conversion. D regions of variable length (typically 50-150 km) and distance from the receiver (up to 600 km) were considered. Calculations show that some signal paths are more sensitive than others to perturbation by D regions and that the size of a D region is less important than its distance from the receiver. For a specified flux, higher-energy electrons produce larger effects than lower energy electrons; for a specified energy, larger fluxes will produce larger signal changes. This study also examines the effects of transmitter-induced electron precipitation on the VLF signals. Such precipitation is known to occur and, as shown here, may on occasion have important effects on certain signals. (Auth. mod.)

K-35430

Rycroft, M., **View of the upper atmosphere from Antarctica,** *New scientist,* Nov. 28, 1985 108(1484), p.44-49.

The Earth's magnetic field directs part of the solar wind towards the polar regions. As a consequence, the antarctic continent provides an ideal natural laboratory for studying a wide range of physical phenomena involving plasmas, fields and a host of wave-particle interactions. Some of these studies are reviewed here, and photographs and charts of places and phenomena are shown.

K-35433

Pereiaslova, N.K., Pokrevskiĭ, P.E., Stozhkov, IU.I., **Effect of the total magnetic field of the sun on the north-south asymmetry of galactic cosmic rays in the atmosphere,** *Soviet physics—Lebedev Institute reports,* 1986 No.3, p.20-23, Translated from Kratkie soobshcheniia po fizike. 6 refs.

The north-south asymmetry of the stream of galactic cosmic rays (GCR) was investigated for the period from 1963 through 1984. A comparison of the measurement data from Murmansk and Mirnyy Station shows a dependence of the asymmetry on the direction of the total magnetic field of the sun, which attests to the existence of a 22-year variation in the asymmetry of GCR. (Auth.)

K-35545

Stebbins, R., Ronan, R., Arrambide, M., **Observation of solar brightness oscillations at the South Pole,** *Antarctic journal of the United States,* 1985 20(5), p.219-220, 2 refs.

The internal properties of the Sun can be deduced from the star's spectrum of mechanical vibrations. A telescope designed to measure brightness oscillations of the Sun was used to take data at Amundsen-Scott Station throughout the austral summer of 1984-1985. Instrumental enhancements, field operations, and progress on data reduction are described. The coverage by these data is contrasted with that of a previous south polar season.

K-35546

Pomerantz, M.A., **Advances in solar seismology at the South Pole,** *Antarctic journal of the United States,* 1985 20(5), p.221-222, 2 refs.

Austral summer 1984-1985 was the most successful campaign thus far for the full-disk helioseismology project. The new modified instrument obtained good quality observations for a total of 480 hours. There were several uninterrupted long runs ranging as high as 6 1/2 days of coronal seeing. Using the data shown, it has been possible to achieve one of the stated objectives of the progam—i.e., to address the question of the frequency dependence of the ratio of the amplitudes of the intensity and Doppler-shift oscillations. Intensity observations of the solar atmosphere temperature minimum were made from the geographic South Pole using a 6-angstrom filter centered on the calcium K-line and a two-dimensional diode array camera. Doppler-shift observations of a pair of photospheric spectrum lines near 6,191 angstroms were made at Kitt Peak using a large grating spectrograph and a similar camera. Both sets of observations were processed to produce power density spectra of zonal oscillations for spherical harmonic degrees 0 to 200. Non-oscillatory background power was subtracted and then the average power over degree ranges 10 to 200 and 50 to 150 was determined. As is shown, over the frequency range 2.5 to 5.0 mH the ratio of intensity fluctuation to Doppler-shift amplitude increases linearly with frequency by a factor of 3.0

K-35547

Wood, F.B., Chen, K.Y., **South Pole telescope,** *Antarctic journal of the United States,* 1985 20(5), p.222-223.

For astronomical observations at the South Pole, it was decided to build an automatic telescope to minimize the cost of operation. This was done, and a 3-inch telescope was established by a field team in Jan. and Feb. 1984. The wintering scientists for the National Science Foundation programs monitored the results. In Jan. 1985, another field team went down for on-the-spot evaluation. As a result of this past year's experience, extensive modifications regarding low-temperature instrumentation are being made, and a telescope is expected to be fully operational by the next austral winter.

K-35548

Pomerantz, M.A., **Far infrared astronomy at the South Pole,** *Antarctic journal of the United States,* 1985 20(5), p.223-225, 8 refs.

Preliminary data on the first sub-millimeter astronomy experiment successfully conducted at the South Pole are reported. Observations include galactic studies, extragalactic studies, calibrations (photometric and beam profile), and properties of the atmosphere. Interstellar dust measurements are discussed and a graph shows a temperature curve.

K-35549

Arnoldy, R.L., Cahill, L.J., Engebretson, M.J., **Pc 1 magnetic pulsations at the South Pole,** *Antarctic journal of the United States,* 1985 20(5), p.225-226, 3 refs.

150 days of spectrograms for South Pole were obtained. Based on what has been learned from both the phase relationship and the strong coincidence of South Pole events with Siple, it can be concluded that it is likely that the South Pole signals are horizontally ducted from lower latitudes. The South Pole noon maximum and the inverse correlation with magnetic activity (Ap) suggests that the horizontal ducting is strongly dependent upon the magnetic field topology and/or ionospheric conditions.

K-35550
Rosenberg, T.J., **Poleward surges of auroral phenomena over the South Pole,** *Antarctic journal of the United States,* 1985 20(5), p.227-228, 4 refs.

During magnetospheric substorms profound changes occur in the magnetic field configuration and in the energy and flow of plasma in the magnetotail. The dynamics of magnetotail plasmas and the relationship to substorm evolution are controversial topics. Currently two competing models describe the phenomenology in vastly different terms; the neutral-line model and the boundary-layer model. To evaluate the relative merits of these models, an examination has begun of the relationships among high-latitude auroral phenomena, substorm phase, and the behavior of magnetotail plasmas, using data from the extensive suite of auroral and ionosphere monitoring instrumentation at the South Pole. A characteristic feature of nightside auroral activity as viewed from the South Pole is the rapid poleward movement of auroral arcs. This feature is accompanied by a simultaneous intensification of electron precipitation. These events are shown in replicas of ionospheric charts and all-sky camera snapshots.

K-35552
Krishnaswamy, S., Rosenberg, T.J., **Riometer measurements of seasonal variations in auroral absorption at South Pole and Siple Stations,** *Antarctic journal of the United States,* 1985 20(5), p.231-233, 11 refs.

Because seasonal changes in auroral absorption are indicators of physical mechanisms governing magnetospheric phenomena; because auroral absorption disrupts high-latitude communications; because seasonal changes provide data for predictive models; and because Siple and Amundsen-Scott Stations lie on either side of the latitude of maximum absorption, it is of great interest to compare riometer data from both stations. Measurements made between 1975 and 1983 are analyzed. There appear to be important differences between Siple and South Pole Stations in the seasonal variation of auroral absorption. Possible explanations for these differences include a change in the characteristics of the precipitated electrons responsible for auroral absorption and/or differences in atmospheric composition and chemistry as one moves across the auroral zone. There are also differences in the relative seasonal absorption at a given site from year to year which may be related to the solar cycle. Both of these results also have important implications for high-frequency radio-wave propagation models at high latitudes.

K-35553
Krishnaswamy, S., Rosenberg, T.J., **Influence of long-term variations in solar radio noise on riometer quiet day curves,** *Antarctic journal of the United States,* 1985 20(5), p.233-234, 8 refs.

In the study of discrete, short-term phenomena, such as individual auroral absorption events, the quantity of interest is usually the excess absorption due to the event; this will not be significantly affected by slowly varying changes in the quiet day curves. However, in studies covering longer periods of time, especially periods involving an appreciable fraction of a solar sunspot cycle, such variations in the quiet day curves become significant. An example is presented of how the sunspot-cycle related changes in solar radio noise output can affect riometer quiet day curves.

K-35554
Inan, U.S., Carpenter, D.L., **Very-low-frequency/low-frequency phase perturbations produced by whistler-induced electron precipitation,** *Antarctic journal of the United States,* 1985 20(5), p.235-237, 16 refs.

Phase changes of 0.1-1.0 microsecond on a 12.9-kHz signal arriving at Palmer over a 2400-km path are regularly observed with a characteristic signature of a rapid onset followed by a relatively slow recovery. The observed phase perturbations are interpreted to correspond to a rapid reduction in the effective nighttime ionospheric reflection height for the subionospheric VLF signals. The incident energetic particle fluxes that are required to produce the extra ionization are estimated to be .001-.01 erg/sq cm/s. Such flux levels are consistent with those estimated using theoretical models of whistler-particle resonant interaction as well as direct satellite-based observations of whistler-induced precipitation.

K-35555
Carpenter, D.L., Smith, A.J., **Using the Siple Station very-low-frequency transmitter as a multi-frequency probe of the Earth-ionosphere waveguide and magnetosphere,** *Antarctic journal of the United States,* 1985 20(5), p.238-239, 3 refs.

The Siple Station horizontal dipole transmitting antenna radiates appreciable power in only a narrow frequency range near the frequency to which the antenna system is tuned. This narrow range limits the uses of the transmitter; for example, it cannot be used simultaneously for both magnetospheric and Earth-ionosphere waveguide probing experiments, because the optimum frequencies used for these two kinds of experiments often differ widely. However, an unexpectedly large third-harmonic component of the transmitter signal has been observed recently at Halley Station. The properties of this newly observed component may help researchers to develop ways of expanding the frequency range—and thus improving the information gathering power of future experiments. These third harmonic frequency range expanding possibilities are discussed.

K-35556
Carpenter, D.L., **Large-amplitude oscillations of subionospheric very-low-frequency signals received in Antarctica,** *Antarctic journal of the United States,* 1985 20(5), p.239-241, 5 refs.

A new feature of subionospheric signal amplitude records is reported, in which the amplitude exhibits comparatively regular fluctuations that last for periods ranging from a few minutes to an hour or more. This phenomenon is particularly well defined in Siple Station records. Examples are shown of the fluctuations in Siple Station amplitude records of signals from Cutler, Maine, 17.8 kH and Annapolis, Maryland, 21.4 kH. A map of the Siple Station area is provided showing great circle paths from several VLF/LF signal sources. The fluctuations are called the "zigzag" effect, because they are more or less symmetrical about the amplitude maxima and minima and frequently exhibit a roughly triangular, or sawtooth-like shape, rather than a sinusoidal one. Periods of the fluctuations are typically in the 10-30-second range, while the amplitudes vary from a few percent to approximately 50 percent of the mean level.

K-35557
Bell, T.F., Katsufrakis, J.P., James, H.G., **New type of very-low-frequency emission triggered at altitudes below 1,400 kilometers by signals from Siple Station,** *Antarctic journal of the United States,* 1985 20(5), p.241-242, 8 refs.

A new type of triggered very-low-frequency (VLF) emission has been discovered in ISIS-2 satellite data acquired at Siple Station for the period of Apr. through Oct. 1983 during joint VLF wave-injection experiments. The joint wave-injection experiments have four main components: (1) broadband VLF/ELF receivers on the ISIS-1 and ISIS-2 satellites; (2) a broadband (1 to 20 kH) controllable VLF transmitter at Siple Station; (3) various VLF navigation and communication transmitters, such as those of the world-wide Omega network; and (4) ground stations in the Antarctic and Canada. The new type of VLF emission is triggered by Siple transmitter pulses as they propagate through the ionosphere and low-altitude magnetosphere up to the ISIS-2 satellite at 1,400 km altitude. It is the only type of emission known to be triggered at low altitudes by manmade signals.

K-35558
Pomerantz, M.A., Bieber, J.W., **New insights into cosmic-ray propagation in the heliosphere,** *Antarctic journal of the United States,* 1985 20(5), p.243-244, 5 refs.

Detailed information on the spatial distribution of cosmic rays in the heliosphere (the region of interplanetary space, extending beyond the orbit of Pluto, that is dominated by plasma emanating from the Sun) is essential for testing theories of the intensity modulations of galactic cosmic rays. An invaluable tool for probing this distribution in three dimensional space is the north-south anisotropy. The most recent study of this phenomenon was carried out to determine the relationship between the magnitude of the north-south anisotropy and the polarity of the Sun's poloidal magnetic field. The initial analysis confirmed the dependence upon the direction of the interplanetary magnetic field, but there was no indication of a dependence on the polarity of the solar poloidal field which was predicted by one of the two competing theories of the highly controversial mechanism of cosmic-ray modulation. There also seemed to be no indication that the north-south anisotropy varied with the phase of the solar cycle. However, the recent extension of the original data base from 1965-1981 to 1961-1983 has now unambiguously revealed that there is indeed a solar cycle variation of the north-south anisotropy.

K-35559
Coco, D.L., Clynch, J.R., **Measurement of ionospheric electron columnar content changes over McMurdo Station,** *Antarctic journal of the United States,* 1985 20(5), p.244-245.

To study the effects of ionospheric scintillations on the tracking of navigation satellites in the southern polar regions, ionospheric electron columnar content change data at McMurdo Station from 1979 to the present have been collected. Much of the data was collected during the period around solar maximum (1979-1983), providing an important tool for studying the morphology and spatial structure of the ionospheric irregularities in the southern polar region. The data were acquired by one ground station observing satellites in different parts of the sky throughout the day. In this past season a bistatic experiment was conducted in which two ground stations, separated by up to 50 km, observed the same satellites simultaneously. These data should provide a more detailed view of the spatial structure of the ionospheric irregularities.

K-35560
Berkey, F.T., Jarvis, M.J., **Simultaneous measurements of the locations of the main ionospheric trough from Siple and Halley Stations,** *Antarctic journal of the United States,* 1985 20(5), p.245-248, 12 refs.

Halley and Siple Stations are uniquely situated in Antarctica *vis à vis* each other and provide an excellent comparison study of the atmosphere over parts of the continent. Riometer, magnetometer, and VLF data from both stations are shown in graphs and discussed.

K-35577
Makarova, L.N., Shirochkov, A.V., **Influence of the solar wind on auroral absorption events at very high geomagnetic latitudes,** *Journal of geomagnetism and geoelectricity,* 1986 38(11), p.1109-1114, 9 refs.

An investigation is made of numerous unusual appearances of auroral absorption events measured by riometers located at the center of the Southern polar cap. It is shown that such nighttime (in MLT) events take place during the expansion phase of magnetospheric substorms and are closely associated with both high velocity solar wind fluxes and strong negative *Bz* values. The polar ionosphere behavior is also studied. A model is available which seems to be an appropriate tool for describing the events if one takes into account the solar wind velocity. It is believed that the daytime polar cap auroral absorption events which are not as numerous and intense as their nighttime counterparts have a different origin. (Auth.)

K-35583
Engebretson, M.J., Meng, C.-I., Arnoldy, R.L., Cahill, L.J., Jr., **Pc 3 pulsations observed near the south polar cusp,** *Journal of geophysical research,* Aug. 1, 1986 91(A8), p.8909-8918, 33 refs.

Comparison is made of high time resolution search coil magnetometer data near local magnetic noon from South Pole Station for Jan. and June 1983 with energetic particle data from DMSP and DE 2 satellites and with interplanetary magnetic field data from the IMP 8 satellite. Broadband irregular magnetic pulsations with period range 0.5-40 s (Pi 1) observed at South Pole Station are associated with the proximity of strong >10-keV electron precipitation, with a somewhat weaker dependence on *Kp* and the proximity of the cusp. Large-amplitude Pc 3 pulsations also appear frequently in the data and are distinguished by their packetlike structure and their nearly monochromatic character. Pc 3 pulsations show little or no correlation with latitudinal position of the cusp, with magnetic activity, or with the presence of >10-keV electron precipitation, but their occurrence is strongly correlated with the *X* component of the interplanetary magnetic field, and their frequency is dependent on the magnitude of this field. The results suggest that no local sources need be postulated to explain the occurrence of Pc 3 pulsations at cusp latitudes and may suggest that upstream wave energy in the Pc 3 frequency range can reach low altitudes on cusp field lines. (Auth.)

K-35596
Fujii, R., **Conjugacies of pulsating auroras by all-sky TV observations,** *Geophysical research letters,* Feb. 1987 14(2), p.115-118, 13 refs.

Simultaneous observations of pulsating auroras were carried out in Sep, 1984, at a geomagnetically conjugate pair of stations: Showa Station in Antarctica and Husafell in Iceland. The following characteristics are found: spatial configuration of pulsating auroras is very similar in the conjugate regions. In this particular event each pulsating aurora has its counterpart with topologically the same shape in the other hemisphere. However, the timing of the appearance or fade-out of the pulsating auroras depends on the type of aurora. That is, the patchy type of aurora appears nearly simultaneously in both hemispheres, but the expansion type of pulsating aurora, extending from an aurora with much slower variations, is not synchronously observed and often appears almost out of phase between the conjugate regions. (Auth.)

K-35606
Nishino, M., Tanaka, Y., **Observations of auroral LHR noise by the sounding rocket S-310JA-6,** *Planetary and space science,* Jan. 1987 35(1), p.127-137, 25 refs.

Electromagnetic noise with banded structure was observed on the sounding rocket S-310JA-6 launched at night on Aug. 27, 1978 from Showa Station, which showed a sharply defined lower cutoff at approximately 5 kHz and an indefinite upper cutoff around 8 kHz corresponding to the lower hybrid resonance frequency of the ambient plasma of the rocket location. The directions of the wave and Poynting vectors and the estimated wave refractive indices indicate that the banded noise excited in the auroral ionosphere by energetic electron streams ($<$or$=5$ keV) in a Landau instability process propagates down to the rocket. (Auth.)

K-35609
Wolfe, A., **ULF geomagnetic power at cusp latitudes in response to upstream solar wind conditions,** *Journal of geophysical research,* Jan. 1, 1987 92(A1), p.168-174, Refs. p.173-174.

Energy densities are computed for geomagnetic field fluctuation in the Pc 3-4 range using *H* component magnetometer data recorded at South Pole Station over a three-month period from June 3 to Sep. 4, 1982. Hourly values of the energy densities in the Pc 3 and 4 period bands are found to be highly correlated during geomagnetic local daytime hours. The results of multivariate analyses between geomagnetic energies and upstream solar wind quantities show that the most important quantity in controlling the magnitude of the field fluctuations is the solar wind speed, with the IMF B component being of next importance. It is concluded that the Kelvin-Helmholtz instability at the dayside magnetopause is, statistically, the dominant energy source that contributes to ULF hydromagnetic wave activity at cusp latitudes. (Auth.)

K-35637

Golian, S.F., **Frequency limits and modal structure of signals on the Moscow-Molodezhnaya route** [Predel'nye chastoty i modovaia struktura signalov na trasse Moskva-Molodezhnaya (Antarktida)], Vzaimodeĭstvie dekametrovykh radiovoln s ionosferoĭ. (Interaction of decametric radio waves with the ionosphere). Edited by L.A. Lobachevskiĭ, Moscow, Institut zemnogo magnetizma, ionosfery i rasprotraneniia radiovoln, 1985, p.81-93, In Russian. 9 refs.

Presented are adiabatic calculations and analysis of the propagation of decametric radio waves on the meridional Moscow-Molodezhnaya route, along 13.7 thousand km, for equinoctial conditions of high solar activity. The global model of the ionosphere was used. The propagation frequency limits are calculated for all channels related to the route, the modes of propagation and the frequency dependence on the time of signal propagation. Results of the calculations are compared with the corresponding mean experimental data.

K-35701

Kuratani, Y., Maeno, H., **Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica in 1985,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1987 No.122, 94p.

Observations of cosmic radio noise, carried out at Showa Station with a standard riometer at 30 MHz, are reported. The hourly values of ionospheric absorption given in the cosmic noise absorption tables are the deviations, in dB, of cosmic noise intensity from the reference sidereal diurnal variation. The reference sidereal diurnal variation is determined from the diurnal variations on several selected quiet days in each month. The geomagnetic H-component is also recorded.

K-35702

Igarashi, K., Maeno, H., Ogawa, T., **Records of radio aurora at Syowa Station, Antarctica in 1985,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1987 No.123, 56p.

Observations of ionospheric irregularities, carried out at Showa Station, are reported. The report includes the periods of radio auroral echoes detected in 1985 and characteristic examples of echo intensity-time variation. Data include 35 mm film records of radio auroral echo intensity with range (A-scope) and range-time intensity (A'-scope), chart records of the time variation of echo intensity, and digital magnetic tape records of the intensity and doppler velocity of auroral radar echoes. Explanations of the diagrams clarify the data showing aurora occurrence, non-occurrence, or periods of no observations.

K-35747

Sakurai, H., Tonegawa, Y., Fujii, R., Sato, N., **Computer compilatory process of the data acquired by the computer system at Syowa Station,** *Antarctic record,* Mar. 1987 31(1), p.77-92, In Japanese with English summary. 5 refs.

Upper atmosphere physics data such as VLF, CNA, magnetic field and ULF have been continuously acquired by the MELCOM 70/25 computer system installed at Showa Station in 1981. The original digital data are compiled using the M-180 computer system at the Information Processing Center, National Institute of Polar Research. The compilatory processes are divided into the following four steps: reproduction of the original tape in order to check the recording conditions; preservation of the original data by changing the recording density on the magnetic tape from 1600 BPI to 6250 BPI; compilation of the utility format tape from the original data; and making summary plots for all of the compiled data. These data are available to users on request. (Auth.)

K-35762

Smith, A.J., Yearby, K.H., **AVDAS—a microprocessor-based VLF signal acquisition, processing and spectral analysis facility for Antarctica,** *British Antarctic Survey. Bulletin,* May 1987 No.75, p.1-5, 24 refs.

A microcomputer-based system is described for the spectral analysis of VLF (0.5-20 kHz) radio waves received at Halley Station. The data are used for studying magnetospheric and ionospheric phenomena including whistler-mode propagation, wave-particle interactions, plasma distribution and drifts, and charged particle precipitation into the ionosphere. Apart from the microcomputer and standard peripherals (VDU, printer disc drives, serial and parallel interfaces, analogue-digital converters), the hardware consists of a specially designed spectrum analyser and spectrographic display unit. Extensive software has been developed. In this paper a technical description is accompanied by representative examples of data acquired and processed by the AVDAS. (Auth. mod.)

K-35763

Gough, H., Jones, D., Yearby, K.H., **ULF/VLF correlator experiment at Halley,** *British Antarctic Survey. Bulletin,* May 1987 No.75, p.17-29, 28 refs.

This paper describes the scientific objectives and first results of a new ULF/VLF project at Halley Station. It also outlines the experimental system and describes its installation during the 1985-86 relief operations. It illustrates how the project fits coherently into the ongoing VLF and geomagnetic observations at Halley. It reports some of the previous observations in this field and the suggested mechanisms for the relationship between the ULF (<3 Hz) and VLF (0.5-10 kHz) waves and their interaction through the charged particles in the magnetosphere and in the ionosphere. The system extends the frequency range of magnetic variations recorded at Halley to cover the 'high' frequency Pc1/2 pulsations, and the relation of these pulsations to the plasmapause is discussed. Two examples of data recorded on the new system are presented, one a structured Pc1 event and the other a correlated ULF/VLF event identified from its cross-spectral phase. (Auth.)

K-35882

Ono, T., Ejiri, M., Hirasawa, T., **Monochromatic auroral images observed at Syowa Station, in Antarctica,** *Journal of geomagnetism and geoelectricity,* 1987 39(2), p.65-95, 32 refs.

A new TV camera system was developed for monochromatic digital imaging of auroras. On the basis of observation in 1984 at Showa Station by the TV system, 3 types of auroral activities were analyzed: stable auroras in the dusk sector, active auroras, and pulsating auroras in the dawn sector. The results are: diffuse auroral belt which appears at the lower latitude border of auroral activity coincides

with the distribution of Hbeta emission; enhancement of auroral 5577 Angstrom emission is much larger than that of 6300 Angstrom emission at the westward travelling surge; and period of auroral pulsation in the dawn sector shows regional variations. The observation suggests that the diffuse aurora in the dusk sector at the lower latitude side is excited by auroral protons, and that a hardening of energy spectrum of precipitating electron is associated with the westward travelling surge. (Auth.)

K-35952

Mizera, P.F., Gorney, D.J., Evans, D.S., **On the conjugacy of the aurora: high and low latitudes,** *Geophysical research letters,* Mar. 1987 14(3), p.190-193, 6 refs.

On December 5, 1983 the polar orbiting satellites NOAA-7 and DMSP-F6, while in opposite hemispheres, each crossed a narrow structure of auroral electron precipitation at nearly the same Universal Time (UT) and at the same high magnetic latitude local time location. The Operational Line Scanner image taken by DMSP-F6 of the northern polar region showed that this enhancement was associated with a sun-aligned arc (SAA) which extended poleward from the midnight sector auroral zone and passed across the polar cap very near to the magnetic pole. NOAA-7 observations show that the analogous precipitation structure in the southern hemisphere was embedded in a region of low intensity ion and electron precipitation which had the characteristics of the plasma sheet population. Comparisons between the boundaries of the lower latitude auroral zone precipitation and the electron distributions at those boundaries were also made. The results of these comparisons together with those made for the high latitude SAA argue for a high degree of interhemisphere conjugacy in the electron precipitation over a wide range of invariant magnetic latitudes. (Auth.)

K-35955

Burns, G.B., ed, Craven, M., ed, **Australian upper atmospheric and space physics research in Antarctica, 1987,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, 262p., Refs. passim. For selected articles see F-35960, I-35974, I-35975, K-35956 through K-35959, K-35961 through K-35973, and K-35976 through K-35979.

The impetus for this collection of short papers was the workshops on solar terrestrial and space physics at the Australian Institute of Physics Seventh National Congress held at the University of Adelaide, Aug. 25-29, 1986. Four papers are from the geomagnetic variations, pulsations and ULF workshop, 9 are from the high latitude ionosphere and upper atmosphere physics workshop, 5 are from the middle atmosphere program workshop, 1 is on auroral radar at Davis, and 8 are invited papers on future antarctic research programs from various authors eminent in their particular fields of research; a total of 27 papers in all, of which 24 are directly related to the Antarctic.

K-35956

Morris, R.J., Cole, K.D., **Pc3 magnetic pulsations at Davis,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.3-16, Refs. p.14-16.

A brief morphological study of Pc3 (10-45 s) ULF magnetic pulsations observed at the polar cusp latitude Davis Station is presented. A significant observation of these deeply amplitude-modulated near monochromatic Pc3 magnetic pulsations are their exceptionally large amplitudes, i.e. 32 nT; which may provide a ground diagnostic for the location of the last closed magnetic field lines, adjacent to the dayside polar cusp. Observational analyses include both diurnal and seasonal amplitude and occurrence distributions, power spectral analyses, dynamic sonagrams and polarization studies. (Auth.)

K-35957

Craven, M., Burns, G.B., **Pulsating aurora and magnetic Pi(c) pulsations,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.17-33, 17 refs.

Strong peak-to-peak correlations, with average time delays less than a second, between auroral optical N2 1NG(0,1) band intensity variations and magnetic Pi(c) pulsations, as observed at Macquarie I. provide convincing evidence of a local ionospheric production mechanism for the magnetic pulsations. Theoretical modelling of an auroral pulsation patch is used to explain the general properties of the magnetic pulsations. The polarization of the Pi(c) pulsations is shown to be controlled principally by a delay between the Hall and Pedersen current fluctuations as measured at the ground, and the direction of the background E-region electric field. (Auth.)

K-35958

Webster, D.J., Fraser, B.J., Rietveld, M.T., Menk, F.W., **Conjugate effects from ground excitation of ULF waves in the ionosphere,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.34-40, 2 refs.

An attempt to observe possible conjugate reception of Pc1 waves produced by modulated ionospheric heating experiments is reported. A number of successful experiments were conducted in 1984 by the Max-Planck-Institut using the Tromsö HF radio transmitters to modulate ionospheric conductivities in the frequency range 0.25 to 8.0 Hz. ULF waves at the modulating frequencies were detected 17 km from the transmitter site. The Newcastle pulsations group operates a ULF induction coil magnetometer at Mawson, the closest station to the conjugate point of Tromsö. Recordings taken at Mawson during the heating experiments have been spectrally analyzed using digital pure state detection techniques to search for conjugate effects. The results obtained and their interpretation are presented. (Auth.)

K-35959

Kemp, W.J., Fraser, B.J., Webster, D.J., **Ground-satellite studies of Pc1 pulsation propagation,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.41-57, Refs. p.55-57.

The magnetospheric generation and propagation characteristics of ion cyclotron waves associated with Pc1 emission observed on Dec. 16, 1977 between 1540-1615 UT in a frequency band 0.5-0.8 Hz by a network of four middle and low latitude ground stations are determined using ground source location techniques and ISEE-1 plasma data. The Pc1 emission band seen on the ground corresponds to the propagation region between the equatorial O and He characteristic frequencies. With these results it is possible to completely describe the wave generation mechanism and the magnetosphere-ionosphere propagation characteristics for this event. (Auth. mod.)

K-35960

Voloshinov, N.N., **Morphology of the midday radio aurora in the Southern Hemisphere,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.58-72, 15 refs.

A joint Australian/USSR auroral radar experiment was conducted at Mawson and Davis stations over the austral 1979-80 and 1982-83 seasons, respectively. The experimental technique is described and a statistical analysis of results presented. It is found that: the Southern Hemisphere midday cusp is always above 74 deg corrected geomagnetic latitude; the probability of observation of radio auroras with the southernmost Davis radar is maximum under the projection of the midday cusp and depends on solar illumination conditions; and the probability of radio aurora occurrence in this cusp region displays a weak dependence on magnetic activity. (Auth.)

K-35961
Phillips, A., Vincent, R.A., **Winds in the middle atmosphere at Mawson, Antarctica: 1. mean circulation and large scale motions,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.86-92, 4 refs.

Winds in the height range 70-110 km have been recorded continuously since July 1984, using the 'partial reflection drifts method' at Mawson Station. This large data-set enables study of the mean circulation and the results can be compared with those from similar high-latitude stations operating in the Northern Hemisphere. Initial results show that there is a high degree of similarity between Mawson and Poker Flat, Alaska, in the zonal components but not as much in the meridional components. Comparisons with recent wind models are also made. (Auth.)

K-35962
Phillips, A., Vincent, R.A., **Winds in the middle atmosphere at Mawson, Antarctica: 2. Tides,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.93-106, 6 refs.

Winds in the region 70-110 km have been recorded continuously using the 'partial reflection drifts method' at Mawson Station since July 1984. The large, continuous data set allows the study of atmospheric tides. Atmospheric tides at high latitudes are of particular interest because diurnal propagating modes are inhibited, allowing study of non-propagating modes in isolation. Results from Mawson are compared with those from the Poker Flat MST radar at similar latitude in Alaska. (Auth.)

K-35963
Phillips, A., Jacka, F., **Winds in the middle atmosphere at Mawson, Antarctica: 3. geomagnetic and meteorological effects,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.107-113, 7 refs.

Winds in the region 70-110 km have been recorded continuously using the 'partial reflection drift' method at Mawson Station since July 1984. An investigation has been made to relate the short term fluctuations with the geomagnetic Kp index and with tropospheric data. Some positive correlations are found; possible causes are discussed.

K-35964
Wardill, P., Jones, N., Jacka, F., **Dynamics of the thermosphere over Mawson, Antarctica: 1. Diurnal variation and geomagnetic dependence,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.114-120, Refs. p.118-120.

A scanning Fabry-Perot spectrometer at Mawson Station was used to measure Doppler shift and broadening of the OI 630 nm emission in the night airglow and aurora. Analysis of these measurements has yielded estimates of neutral thermospheric temperatures and wind velocities in the 200-300 km region. Viewed in geomagnetic coordinates the averaged wind velocities were south-westward (sunward) during the afternoon and evening hours and equatorward (antisunward) around magnetic midnight. Wind speeds ranged from about 100m/s during quiet and moderate geomagnetic conditions up to about 200m/s during disturbed conditions. The results confirm that the principal momentum source in the high latitude thermosphere is ion drag, resulting from the motion of ions in response to the polar electric field pattern. (Auth.)

K-35965
Jones, N., Wardill, P., Jacka, F., **Dynamics of the thermosphere over Mawson, Antarctica: 2. Dependence on the Y component of the interplanetary magnetic field,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.121-130, 6 refs.

The thermospheric wind signatures that would be expected at a southern auroral zone location for each of the characteristic field geometries are considered, and thermospheric wind data obtained at Mawson Station during 1981, 1982 and 1983 are examined for evidence of them. Some features of the expected signatures are observed in the night-time wind data from 1981 and 1983. More convincing evidence is found in two separate twenty-four hour long continuous wind observations made using the daylight observing capability of the Mawson FPS. (Auth. mod.)

K-35966
Wardill, P., Jacka, F., **Dynamics of the thermosphere over Mawson, Antarctica: 3. Horizontal divergence of the wind field,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.131-137, 10 refs.

Measurements of the thermospheric neutral wind velocity at Mawson Station frequently reveal large horizontal divergence. The observed wind field at any given time may be decomposed into contributions from a uniform background wind and from a divergent line source oriented along the geomagnetic east-west direction. The calculated motion of the hypothetical line source is in qualitative agreement with that of the auroral electrojet. It is proposed that the electrojet drives a divergent flow via momentum deposition resulting from the dissipation of gravity waves above about 200 km. (Auth.)

K-35967
Jones, N., Jacka, F., **Dynamics of the thermosphere over Mawson, Antarctica: 4. The lower thermosphere,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.138-147, 11 refs.

During the austral spring of 1981, at Mawson Station, measurements were made of the spectrum of the nighttime 558 nm emission from atomic oxygen in the lower thermosphere. The spectra have been analyzed to yield wind and temperature information. The inferred temperature was highly variable. An argument for assigning the emission to the 100-130 km altitude region is presented. The wind, when viewed in the geomagnetic-coordinates/magnetic-local-time frame, was poleward and westward around dusk, equatorward and westward around midnight. The observed winds show excellent qualitative agreement with the predictions of a three-dimensional, time-dependent, global thermospheric numerical model due to Fuller-Rowell and Rees (1980, 1984), which includes the effect of ion drag and a specification of the high-latitude electric field. (Auth. mod.)

K-35968
Price, G., Vincent, R.A., Jacka, F., **Winds and temperatures in the mesosphere and lower thermosphere at Mawson, Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.148-159, 18 refs.

Records of temperature, and horizontal and vertical wind components in the mesosphere/lower thermosphere, were obtained at Mawson Station during Sep. and Oct., 1985. A scanning Fabry-Perot spectrometer was used to obtain vertical wind and temperature measurements in the lower thermosphere. A 2 MHz partial reflection radar using the spaced antenna method, gave horizontal wind data

over the height range 70 to 110 km. A preliminary examination of the results is presented. (Auth.)

K-35969
Williams, P.F.B., **OH nightglow observations and temperature determinations at Davis, Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.176-186, 5 refs.

Observations of OH(8-3) nightglow at Davis Station in 1984 were used to estimate rotational temperatures for the emitting region. Possible causes for the apparent non-Boltzmann like distribution of the rotational populations were investigated. A periodic intensity variation on June 12 was also recorded. (Auth.)

K-35970
Hajkowicz, L.A., Hunsucker, R.D., **Simultaneous observation of large-scale periodic TIDs in both hemispheres following an onset of auroral disturbances,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.187-197, 5 refs.

An onset of an auroral substorm at the equatorward edges of the southern and northern auroral zones preceded the occurrence of periodic variations in the virtual height (h'F) of the F-region in the Southern and Northern Hemispheres. The variations in h'F had characteristics typical of large scale TIDs (LS TIDs) propagating equatorwards with a velocity of about 800m/s, and with a constant period of 135 minutes in both hemispheres. The horizontal wavefront of LS TIDs was observed in mid-latitudes to be in excess of 7000 km. The LS TIDs were found to be in phase at the stations which are equidistant from the auroral sources. From this it was concluded that the periodic LS TIDs were likely to produce a constructive interference effect at the points of their encounter, near the equator. (Auth. mod.)

K-35971
Lambert, M., Essex, E.A., **Studies of ionospheric irregularities around L=4 in the Southern Hemisphere using satellite beacons,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.198-205, 5 refs.

From Dec. 28 1983 to Mar. 10, 1985 total electron content (TEC) data were gathered from Macquarie I. in the southern auroral zone using the Faraday rotation technique. The beacons on the geostationary satellites ATS-1 and ETS-2 transmitting on 137.35 MHz and 136.112 MHz were used. Preliminary analysis of the data indicates that large scale fluctuations in the TEC occur which are associated with auroral activity. Some of these disturbances propagate towards the mid latitudes with speeds of from 200 to 1000m/s. Large scale rapid decreases in TEC were observed during the evening hours on about one third of the Sep. equinox days studied. These decreases occurred at a geomagnetic latitude assumed 60 S and could be associated with the main ionospheric trough traveling through the ray path from the satellite to the receiving station. (Auth.)

K-35972
Cole, K.D., **Role of the Antarctic in international upper atmosphere programs,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.206-214.

A brief outline of the importance of upper atmosphere physics research in Antarctica is given. This is followed by short descriptions of the programs of the Scientific Committee on Solar-Terrestrial Physics and the opportunities for Australian antarctic input. Spin-offs from the research are highlighted. (Auth.)

K-35973
Jacka, F., Vincent, R.A., **Dynamics and energetics of the upper atmosphere at Mawson—recommendations for future work,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.215-220, 4 refs.

A brief summary of ideas about the dynamics of the upper atmosphere in high latitudes is presented along with references to the results of work at Mawson. Recommendations are made for continuation of work with the 'partial reflection drift' (PRD) radar and the Fabry-Perot spectrometer (FPS) at Mawson. For the longer term it is recommended that consideration be given to the construction and installation of an imaging FPS for use at Mawson, and transfer of the present FPS to Casey. Finally, if the opportunity arises with international collaboration, the installation of an incoherent scatter radar at Mawson should be given serious consideration. (Auth.)

K-35976
Fraser, B.J., Morris, R.J., **Australia's magnetospheric research in Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.236-245, 1 ref.

Antarctica is a very important continent for the study of magnetospheric physics since the polar cap and cusp region provide the most direct connections between ground recording stations and the outer boundaries of the earth's magnetosphere; the auroral zone, situated at slightly lower latitudes than the cusp, is a region of great energy deposition. The Australian antarctic stations are favorably situated to study the physics of these regions. A 5 year program using 5 antarctic stations to study the transport of energy through the auroral and cusp regions by ultra low frequency plasma waves is proposed and involves the Antarctic Division, two universities and international collaboration. (Auth.)

K-35977
Essex, E.A., **AUSSAT beacon proposal—relevance to antarctic stations,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.246-252, 9 refs.

The second generation AUSSAT (1992 et seq.) satellites provide the Australian upper atmosphere scientific community with the opportunity to re-enter the space age. To this end a proposal for a radio beacon experiment on AUSSAT has been prepared by the Ionospheric Prediction Service, Department of Science, in conjunction with the universities of La Trobe and Monash. The location of the spacecraft in geosynchronous orbit at 156-164 E longitude means that the subantarctic station of Macquarie I. is ideally suited as a ground station. Unless the longitude position is moved further west, the Australian antarctic mainland stations are not suitably located for ionospheric studies using the AUSSAT beacons. Possible ionospheric studies using the AUSSAT beacons are outlined. (Auth.)

K-35978
Dyson, P.L., **Polar cap ionosphere,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.253-257, 4 refs.

A proposal is presented for the establishment of a modern digital ionosonde at Casey Station, which would provide an excellent means of studying the ionosphere in the polar cap region, information on the state of the ionosphere to aid the interpretation of optical and magnetic measurements, and a means of studying auroral phenomena during daylight hours.

K-35979
Wilkinson, P.J., **SUNDIAL campaigns,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Apr. 1987 No.48, p.258-262.

SUNDIAL is the name chosen for a series of campaigns which will improve understanding of the solar terrestrial environment. An outline of a co-ordinated campaign to develop a real-time prediction capability for the ionosphere is presented. The contributions antarctic stations can make to this program are noted. (Auth. mod.)

K-36044
Rycroft, M.J., **Strange new whistlers,** *Nature,* June 4, 1987 327(6121), p.368-369, 15 refs.

Whistlers are radiowaves of audio frequency whose source is an almost instantaneous lightning discharge. Such whistler-mode waves are guided through the magnetosphere from one hemisphere to the other by ducts of enhanced plasma density, which are aligned along geomagnetic field lines. On page 405 of this issue, (see K-36045) Armstrong reports a strange new phenomenon—the apparent triggering of one whistler by an identical one occurring about 5 seconds earlier. Armstrong considers the likelihood of this type of event statistically and concludes that it is not a chance coincidence. Following a short discussion of how whistlers act in the atmosphere and their close relationship to thunderstorms, the one-hop whistlers of Armstrong's article are examined and explained.

K-36045
Armstrong, W.C., **Lightning triggered from the Earth's magnetosphere as the source of synchronized whistlers,** *Nature,* June 4, 1987 327(6121), p.405-408, 44 refs.

Specific patterns established by natural radio signals echoing periodically in a magnetospheric whistler duct are sometimes observed to indicate strongly preferred times at which identical, well-defined whistlers occur. Ordinarily such whistlers would be assumed to originate in the stronger ground strokes of spontaneous lightning. These nonrandom whistlers are therefore unexpected and raise the possibility that some whistler-source discharges may be triggered from the magnetosphere. The same possibility could also be predicted independently from another type of recent observations. Selected examples of nonrandom whistlers are given here and the supporting observations described. In the absence of a previously developed theoretical explanation, a trigger mechanism is outlined which emphasizes discontinuous discharge to the upper atmosphere. Such a mechanism might help explain several related phenomena. Examples shown are from data recorded at Siple Station. (Auth.)

K-36055
Ejiri, M., ed, **Proceedings of the Ninth Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 1986,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, 224p., For selected papers see G-36057, G-36064, I-36059, I-36060, K-36056, K-36058, and K-36061 through K-36063.

The symposium consisted of the following ten sessions: 1) ionospheric and magnetospheric disturbances in the polar regions, 2) auroral dynamics, 3) sounding rocket observations, 4) satellite observations, 5) sounding balloon observations, 6) geomagnetic disturbances associated with storm sudden commencements and substorms, 7) geomagnetically conjugate observations, 8) Middle Atmosphere Program (MAP) in Antarctica, 9) ELF, VLF and HF wave phenomena, and 10) solar wind-magnetosphere-ionosphere interactions. The present volume contains 22 scientific papers selected from 83 individual contributions presented at the symposium. These papers are classified into 4 groups: observational results of sounding rockets and balloons operating at high latitudes; results of the MAP (Middle Atmosphere Program); conjugate phenomena at Showa Station and Iceland; and ULF-VLF waves in the polar and the lower latitude regions as well as their propagation and generation mechanisms. (Auth. mod.)

K-36056
Ejiri, M., Hirasawa, T., Ono, T., Oguti, T., **Auroral images and particle precipitations observed by the sounding rocket experiment at Syowa Station,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 9th, 1986, edited by M. Ejiri, p.1-21, 23 refs.

Three sounding rockets were launched in 1984 from Showa Station into different types of aurora, designated as AURORA I (an active auroral arc at the substorm expansion phase), II (a stable arc prior to the substorm onset) and III (a diffuse aurora during the recovery phase). A new low-light-level television camera was also used to take an auroral picture downwards from the spinning rocket, together with the electrostatic quadrispherical and magnetic electron spectrometers to measure the energy spectrum of auroral particles (electrons). AURORA I showed greater values in both auroral emission and electron density than AURORA II. In AURORA III, although the auroral emission intensity was much less in comparison with AURORA I, the electron density showed a pronounced enhancement in the *D* region and was comparable to AURORA I above the *E* region. The electron temperatures for the 3 cases do not differ much and are quite similar to one another below 150 km in altitude. As for an energy spectrum of auroral electrons, AURORA I and II showed an inverted-V type monoenergetic peak with much greater energy for AURORA I than for AURORA II, whereas AURORA III exhibits a power-law spectrum with a small superposing monoenergetic peak around 0.5 keV above 200 km in altitude. (Auth. mod.)

K-36058
Iversen, I.B., **Preliminary results from the auroral zone ionosphere observations during the AZCO balloon campaign in 1985,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 9th, 1986, edited by M. Ejiri, p.36-43, 16 refs.

In July 1985 a joint Japanese-Danish-Norwegian balloon campaign for auroral zone conjugate observations (AZCO) was carried out. The campaign complemented measurements at Japanese geophysical stations in Iceland and in Antarctica. The instrumentation on the ground included magnetometers, riometers, and VLF detectors in both conjugate areas and also back-scatter radar and auroral monitors in the South. The balloons were equipped with detectors for X rays, electric fields, and VLF electromagnetic emissions. This report is preliminary as the data have not been reduced thoroughly yet. Information has been obtained about particle injection during substorms and the connection between ionospheric electric and magnetic fields. (Auth.)

K-36061
Nagano, H., **Geomagnetic sudden commencements observed at the Syowa-Iceland conjugate stations,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 9th, 1986, edited by M. Ejiri, p.78-91, 19 refs.

In order to clarify characteristics of geomagnetic sudden commencements (SCs) at geomagnetically conjugate stations, 6 SC events were analyzed by the use of digital magnetic data at Showa Station in Antarctica and Husafell, Isafjördur and Tjörnes in Iceland from Sep. 1984 to Jan. 1985. SC polarization, waveforms and SC-associated pulsations are examined between the conjugate stations, and the char-

acteristics are discussed in comparison with a model suggested for the latitudinal reversal of SC polarization in high latitudes on the ground. (Auth.)

K-36062

Kato, Y., Tonegawa, Y., **Pi 1 pulsations associated with substorms and their conjugate behavior,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 9th, 1986, edited by M. Ejiri, p.92-96.

Short period geomagnetic pulsations associated with substorms in the frequency range from about 0.1 to 0.4 Hz are investigated using the dynamic spectrum analysis technique, and it was found that these Pi 1 pulsations are excited simultaneously with Pi 2 pulsations and they show a clear conjugate behavior. These results suggest that Pi 1 pulsations might be ion-cyclotron waves generated in the geomagnetic tail due to a drastic change of geomagnetic field configuration in the course of a substorm. (Auth.)

K-36063

He, C., Tschu, K., **Preliminary studies on the whistler observation of Great Wall Station of China, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Mar. 1987 No.47, Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, 9th, 1986, edited by M. Ejiri, p.148-156., 10 refs.

During the First Chinese National Antarctic Research Expedition 1984/85, observation on whistler and VLF emission was carried out by using GM type VLF broadband direction-finding receiver. The morphology of whistlers received shows 2 peaks of their activity at 17-20 LT and at 03-06 LT. Whistler dispersion is greater during sunset and less after midnight. Detailed analysis of whistler data of Jan. 23 and 26 at Great Wall Station reveals that the dispersions of whistlers propagating in different shells markedly decrease on the day of geomagnetic storm commencement (Jan. 23). It implies a rapid depletion of the electron density in the shells. There is a downward flux of electron of 1 billion el/sq cm s. A steady refilling process occurs in shells of L=2.8-2.9, 3 days after the storm on Jan. 26. Whistler direction-finding data obtained on Jan. 20 show that the exit points of the whistlers are situated in a strip of about 80 km wide in longitudes with an azimuthal direction 20-40 deg E of N between 48-52 deg geomagnetic latitude, and there are no obvious cross L or longitudinal drifts. Whistler data at great Wall Station are very useful for deducing temporal and spatial variations of electron density in L=2-3 shells and investigating particle interchange processes between the ionosphere and the plasmasphere. (Auth.)

K-36106

Niedner, M.B., Jr., Liller, W., **IHW Island Network,** *Sky and telescope,* Mar. 1987 73(3), p.258-263.

The International Halley Watch Island Network grew out of the need for additional coverage of Halley's comet from the Southern Hemisphere. The idea was to place portable Schmidt cameras on remote islands to monitor the comet. Since funds were available only to purchase the equipment, one of the most difficult aspects of the program was finding volunteers to operate the cameras. After considerable effort, the final sites selected were Tahiti, Easter I., the British Antarctic Survey's Faraday Station on the Antarctic Peninsula, the South African Astronomical and Cedarberg observatories, and Reunion I. The equipment at each site is described together with the transport of the equipment.

K-36107

Morris, R.J., Cole, K.D., **"Serpentine emission" at the high latitude antarctic station, Davis,** *Planetary and space science,* Mar. 1987 35(3), p.313-328, 18 refs.

Almost a decade has passed since Gul'elmi and Dovbnya (1974) introduced the high latitude class of ultra low frequency pulsations known as "Serpentine Emission" (SE). The purpose of this paper is twofold; firstly, to present new morphological results of SE observed at Davis Station and, secondly, to stimulate further experimental and theoretical interest by pulsation researchers. Analyses presented include the first cited amplitude-time structure of SE along with maximum entropy power spectra and digital sonagrams. SE polarizations are investigated and a limited diurnal morphological survey is presented. (Auth.)

K-36127

Iijima, T., Shibaji, T., **Global characteristics of northward IMF-associated (NBZ) field-aligned currents,** *Journal of geophysical research,* Mar. 1, 1987 92(A3), p.2408-2424, Refs. p.2423-2424.

Global characteristics of large-scale field-aligned current (FAC) systems have been determined by analyzing the magnetic disturbances acquired with the MAGSAT satellite in the southern summer hemisphere during Nov. 1979 through Jan. 1980 for the 3 cases of the IMF Bz>By>0, IMF By>Bz>0, and IMF By>0 and Bz<0. Transverse magnetic disturbances having a half wave-length larger than 113 km at the MAGSAT altitudes in the range of about 350 to about 550 km were subjected to the present analysis. The global distribution was limited by the MAGSAT orbits over the south pole to latitudes above about 83 deg ML (magnetic latitude) on the dayside and above about 71-72 deg ML on the nightside. The large-scale FAC systems include the usual region 1 and 2 systems and the recently found NBZ system. The NBZ system denotes the FACs which flow into and away from the polar cap ionosphere (poleward of the region 1 system) during periods of the IMF Bz>0. The conclusions from this study are the continuous transition in the FAC pattern (NBZ + region 1 + region 2 systems) from IMF Bz>0 to IMF Bz<0 and the disconnection between the dayside and the nightside parts of these FAC systems. (Auth. mod.)

K-36193

Rosenberg, T.J., Dudeney, J.R., **Local time, substorm, and seasonal dependence of electron precipitation at L = 4 inferred from riometer measurements,** *Journal of geophysical research,* Nov. 1, 1986 91(A11), p.12,032-12,040, 33 refs.

DLC QC811.J6

The variations of electron precipitation at L = 4 as inferred from riometer measurements of cosmic radio noise absorption made during 1975 at Siple Station and Halley Bay were examined. The results are presentcd in the form of annual and seasonal averages of 1/2-hourly values for two geomagnetic activity subsets, AE>140 nT (disturbed) and AE<140 nT (quiet). Monthly quiet day curves were used to remove the diurnal and seasonal variations in the background noise levels. Generally, the local time characteristics of the absorption were the same at both stations; the highest absorption occurred in the 0400-1600 MLT sector during disturbed conditions and in the 1200-2000 MLT sector during quiet conditions. For high AE, the highest correlation was obtained at a lag equal to the magnetic local time difference (1.5 hours) between the two stations. On the other hand, for low AE, the highest correlation occurred for a lag of 3.0 hours, nearer the local solar time difference (3.8 hours). Consistently higher absorption was measured at Halley on the average during both levels of magnetic disturbance and in all seasons. At both locations, and for both geomagnetic activity subsets, more absorption was observed in summer and equinox than in winter. (Auth. mod.)

K-36198
Vovk, V.IA., Byn'ko, I.G., **Radio wave propagation over the Moscow-Antarctica path** [O traektoriiakh rasprostraneniia radiovoln na trasse Moskva-Antarktida], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.81, p.78-86, In Russian. 4 refs.

Possible paths of radiowave propagation are derived from experimental oblique sounding and the distribution of angular parameters measured on the Moscow-Molodezhnaya trajectories in July-Dec. 1979. The possibility of radio wave reception through the back side of the Earth is considered. The best time for such "backside" signals is just before sunset during the equinoctial periods.

K-36199
Vovk, V.IA., Ignatov, V.S., **Assessment of admissible time deviations of radio signals due to the multipath character of radio communication Moscow-Molodezhnaya** [Otsenka dopustimykh vremennykh iskazheniĭ radiosignala vsledstvie mnogoluchevosti na antarkticheskoĭ radiolinii Moskva-Molodezhnaia], *Sovetskaia antarkticheskaia ekspeditsiia. Trudy,* 1986 No.81, p.86-92, In Russian. 7 refs.

The basic principles are discussed of the integral distribution of maximum relative signal delays, determining the degree of protection necessary to avoid the damaging multipath features of the Moscow-Molodezhnaya radio link. Admissible delays are assessed and limits of information volume are determined for different seasons and different times of day.

K-36221
Saito, H., Yoshino, T., Sato, N., **Narrow-banded ELF emissions over the southern polar region,** *Planetary and space science,* June 1987 35(6), p.745-752, 8 refs.

Narrow-banded ELF emissions in the frequency band of 100-500 Hz have been observed in the VLF data received at Showa Station from *ISIS* 1 and 2. The occurrence distributions of narrow-banded ELF emissions over the southern polar region have been studied statistically. It is found that emissions mostly occurred in the evening 17-24 M.L.T. sector and in the region of 65-75 deg invariant latitude associated with V-shaped VLF hiss emissions. The emissions are correlated with disturbed geomagnetic activity and the occurrence region shifts to lower latitude in association with increased geomagnetic activity. It is also found that emissions maximize during austral winter season, from Apr. to July. The emission frequencies are strongly dependent on the satellite's altitude. These results suggest that narrow-banded ELF emissions are excited in the topside ionosphere by upflowing ion or downflowing electron fluxes and that the growth rate strongly depends on the ambient electron density. The relation between the emissions observed by the satellite and on the ground is also discussed. (Auth.)

K-36222
Tulunay, Y.K., Grebowsky, J.M., **Hemispheric differences in the morphology of the high latitude ionosphere measured at about 500 km,** *Planetary and space science,* Jule 1987 35(6), p.821-826, 5 refs.

Ambient electron density measurements made by the radio frequency capacitance probe on *Ariel* 4 have been analyzed in order to study the structures present at about 500 km altitude at high latitudes during the 1971 Northern Hemisphere winter (Dec. solstice) and the 1972 Southern Hemisphere winter (June solstice); data obtained on 94 days centered on each solstice have been used. The general morphology of and the extreme densities within the mid-latitude electron density trough, the polar cap depletions and the electron density enhancements associated with the cusp-auroral zone were determined statistically. Analyses of data acquired during quiet magnetic conditions show that the Northern and Southern Hemisphere winter ionospheres were significantly different; in particular, the Southern Hemisphere densities were lower than those in the Northern Hemisphere. The maximum electron densities observed in the Northern Hemisphere occurred in a magnetic-local-time range symmetrical about the 02-14 M.L.T. meridian, whereas in the Southern Hemisphere the maxima were symmetrical with respect to the midnight-noon magnetic meridian. (Auth.)

K-36261
Charakhch'ian, T.N., **Enigmas of the zonal modulation of cosmic rays,** *Geomagnetism and aeronomy,* Aug. 1986 26(1), p.8-13, For Russian original see 15K-34288. 16 refs.

The modulation effects of the charged component of cosmic rays in the lower atmosphere ($X > 300$ g/sq cm) are discussed in terms of sounding measurements made at Murmansk, Moscow, Alma-Ata and Mirnyy Station. The observed effects cannot be explained by the existing concepts of the modulation of galactic cosmic rays, nor by the known magnetospheric and atmospheric effects in cosmic rays. (Auth.)

K-36262
Okhlopkov, V.P., Okhlopkova, L.S., Charakhch'ian, T.N., **Annual cosmic-ray variations in the lower atmosphere,** *Geomagnetism and aeronomy,* Aug. 1986 26(1), p.19-22, For Russian original see 15K-34289. 11 refs.

The manifestations of zonal modulation in annual cosmic-ray variations are investigated on the basis of atmospheric soundings. The properties of the annual variations have been found to have changed sharply after 1971. (Auth.)

K-36263
Charakhch'ian, T.N., **Time-dependence of the short-range component of cosmic rays in the stratosphere,** *Geomagnetism and aeronomy,* Aug. 1986 26(1), p.23-29, For Russian original see 15K-34290. 15 refs.

The time dependence of the short-period component of cosmic rays in the stratosphere is studied on the basis of soundings in 1958-1983. It is found that short-period particle fluxes are characterized by a reverse latitudinal effect, which suggests what magnetospheric and atmospheric effects may play an important role in the formation of these fluxes. (Auth. mod.)

K-36264
Bol'shakova, O.V., **Long-period geomagnetic pulsations in high-latitude magnetically conjugate regions,** *Geomagnetism and aeronomy,* Aug. 1986 26(1), p.136-137, Translated from Geomagnetizm i aeronomiia. 6 refs.

An analysis was made of the conjugate nature of pulsations using the method of direct comparison of the magnetograms of two high-latitude observatories of the northern and southern hemispheres in 1977: Sundrestrom Fjord and South Pole. Examples of symmetrical and asymmetrical appearance of long-period pulsations in the northern and southern hemispheres near the daytime polar cusp are presented. It is concluded that by studying the geomagnetic pulsations at conjugate points in a fixed high-latitude interval, it is possible to judge the structural changes and asymmetry of the high-latitude magnetosphere from the degree to which they are conjugate.

K-36310
Rosenberg, T.J., **Coordinated ground and space measurements of an auroral surge over South Pole,** *Journal of geophysical research,* Oct. 1987 92(A10), p.11,123-11,132, 29 refs.

The surge produced a rapid onset of cosmic radio noise absorption at the station. On the polar-orbiting DMSP F6 spacecraft, intense X ray emissions with E>2 keV energy were imaged 1 deg to 2 deg magnetically equatorward of South Pole approximately 1 min prior to the peak of the absorption event. The spectrum of precipitating electrons determined from the X ray measurements could be characterized by an e-folding energy of ~11 keV and is adequate to account for the cosmic noise absorption and maximum auroral luminosity recorded at South Pole. Photometer, all-sky camera, riometer, and magnetometer data are used to estimate the velocity of motion and spatial extent of the auroral precipitation and the ionospheric currents associated with the surge. Details of the measurements are discussed. (Auth. mod.)

K-36327

Pomerantz, M.A., **Astronomy on ice,** *Astronomical Society of Australia. Proceedings,* 1986 6(4), p.403-415, Refs. p.414-415.

The geographic South Pole, where the United States maintains a year-round scientific station, affords continuous viewing and constant declination of all objects in the southern celestial hemisphere, under conditions of exceedingly low humidity, extended periods of coronal seeing, high altitude, and uniform terrain. The areas of research that have already benefited immensely from these extraordinary features, such as helioseismology and submillimeter astronomy, are reviewed. Unparalleled observations of global solar oscillations have already yielded significant information about the structure and dynamics of the Sun's interior. Far infrared measurements of various galactic and extra-galactic regions have attained an unprecedented level of sensitivity, limited for the first time only by the noise inherent in the detector. In addition to further helioseismological observations, currently planned future activities include observational cosmology and ultra high energy gamma ray astronomy. (Auth.)

K-36336

Suzuki, H., Sato, N., **Seasonal and diurnal variations of ELF emission occurrences at 750-Hz band observed at geomagnetically conjugate stations,** *Journal of geophysical research,* June 1, 1987 92(A6), p.6153-6158, 12 refs.

Statistical characteristics of emission occurrence are examined, using digital data of 750-Hz intensity records obtained at the conjugate pair of stations, Showa Station in Antarctica and Husafell in Iceland. The following notable diurnal and seasonal variations were found: (1) emissions were mostly observed during the daytime in the conjugate region; emission occurrence rate reached maximum at Husafell 2-3 hours later than at Showa. (2) Seasonal variations of emission occurrence showed the same tendency at the conjugate stations. Emission intensities showed a maximum during local summer and a minimum during local winter in both hemispheres. The ratio of average emission intensity in each season to the intensity in winter is approximately 2.1-2.2 for summer, 1.7-1.9 for autumn and 1.7 for spring. From these statistical characteristics, ELF emission intensity appears to depend strongly on not only magnetic local time but also geographic local time and season, suggesting that ELF emissions observed on the ground are firmly controlled by sunlight effects. Sunlight may affect the asymmetry of wave duct enhancement and wave propagation from the magnetosphere to the ionosphere in both hemispheres. Other effects are also discussed in this paper. (Auth.)

K-36337

Sato, N., Kokubun, S., Saemundsson, T., **Geomagnetic conjugacy of 30-kHz band auroral hiss emissions observed at L=6.1,** *Journal of geophysical research,* June 1987 92(A6), p.6159-6162, 17 refs.

Statistical characteristics of auroral hiss emissions in the 30-kHz band were examined using the data observed simultaneously at the Showa-Husafell conjugate pair of stations during the period of Sep.-Nov. 1983. The occurrence probabilities of conjugate events observed simultaneously at the two stations were almost the same in Sep. and Oct. and decreased during Nov. These phenomena were mostly observed during 1700-2300 MLT around the geographic midnight at Showa. On the other hand, the number of nonconjugate phenomena detected only at Husafell in Iceland increased from Sep. to Nov. The occurrence peaks were around 2100-0200 MLT, before geographic midnight at Husafell. From these statistical characteristics it appears that auroral hiss emission occurrences strongly depend on not only the magnetic local time but also the geographic local time and season, suggesting that auroral hiss emissions observed on the ground are strongly controlled by sunlight effects in the topside ionosphere. (Auth.)

K-36417

Wrenn, G.L., Rodger, A.S., Rishbeth, H., **Geomagnetic storms in the antarctic F-region. I. Diurnal and seasonal patterns for main phase effects,** *Journal of atmospheric and terrestrial physics,* Sep. 1987 49(9), p.901-913, 28 refs.

New analysis procedures are used to show that the main phase mid-latitude storm effects conform to consistent patterns in local time when suitable selection rules are applied, with averaging over several years. Changes in *foF2,* with respect to estimated quiet-time values, are analyzed in terms of a new geomagnetic index derived to take account of integrated disturbance. Reduction of *foF2,* is greatest during the early morning hours, in summer, at higher geomagnetic latitudes, near solar minimum and through the more active periods. The various dependencies are quantitatively determined for the first time by creating an average 'steady state' disturbance, rather than following specific storm events. This approach will permit tests of competing theories using available modelling programs. (Auth.)

K-36445

Voloshinov, N.N., Troshichev, O.A., **Effects of interplanetary magnetic field on the distribution of radioaurora in the southern polar cap,** *Planetary and space science,* Mar. 1986 34(3), p.307-314, 13 refs.

DLC QC801.P5

The analysis of the spatial distribution of the radioaurora in the southern polar region carried out on the basis of radar observations at Davis Station shows the following: perfect aspect conditions typical of Davis Base make it possible to see the radioaurora in the latitude range phi prime=76-84 at any time of a day. Probability of radioaurora occurrence is maximum (up to 100%) in the daytime cusp region, that is at the latitudes phi prime=78-79 when Bz<0 and phi prime=79-80 when Bz>0. Maximum of radioaurora occurrence is displaced towards morning hours when Bz<0, By<0 or Bz>0, By>0 and toward evening hours when Bz<0, By>0 or Bz>0, By<0. The displacement of radioaurora into the morning or evening sector may be considered as a result of redistribution of the electric field intensity in the dayside polar cap when affected by the IMF Bz and By components. (Auth.)

K-36476

Sokolov, S.N., Ul'ev, V.A., **Applicability of VLF phase observations on transpolar paths to observations of polar cap absorption** [Ispol'zovanie nabliudeniĭ fazy SDV na transpoliarnykh trassakh dlia kontrolia PPSh], *Akademiia nauk SSSR. Mezhduvedomstvennyĭ geofizicheskiĭ komitet. Magnitosfernye issledovaniia,* 1987 No.9, p.88-93, In Russian with English summary. 12 refs.

Several solar proton events (SPE) in 1978-1981 registered from observations of the phase anomalies of the VLF-transmitter signals of the Omega radionavigation system over extended transpolar paths and from the data of riometric and satellite measurements, some obtained at Vostok Station, are analyzed. A relationship between the decrease in the ionospheric waveguide effective height (under condi-

tions of a one-mode propagation) and the riometric absorption logarithm at lighted stations in the northern and southern polar caps is obtained empirically. The relationship turns out to be linear. A high correlation of these values variations on the stage of the SPE depression allows VLF-wave observations on a one-mode propagation line to be used when estimating the IMF value at the highest latitudes in the polar cap. The phase observations could be applied in evaluating an integral proton flux associated with the riometric absorption. The riometric data could be used in correcting the VLF wave phase variations on the transpolar lines at the high latitudes in the course of the SPE. It is shown that the simultaneous phase observations on two or more transpolar lines with one-mode propagation allow to estimate a position of the equatorial edge of the disturbed ionospheric region in the course of the SPE. Phase observations allow us as well to perform earlier detection of the beginning of the solar proton precipitation to the polar cap region, compared to riometers. (Auth.)

K-36518

Rycroft, M.J., **Antarctica, a unique laboratory for atmospheric studies by optical methods,** *Surveys in geophysics,* June 1987 9(2), p.215-229, 27 refs.

Optical methods of studying the atmosphere are one valuable means of investigating atmospheric behavior at heights ranging from less than 1 km to several hundred km. Some examples are given of results from various optical experiments carried out at Halley Station, as is a consideration of the results of some complementary experiments. By combining observations made using different techniques, an improved understanding of atmospheric, ionospheric and magnetospheric processes is obtained. (Auth.)

K-36574

Yamagishi, H., **Upper atmosphere physics data, Syowa Station, 1985,** *Japanese Antarctic Research Expedition. JARE data reports,* July 1987 No.128, 272p., 5 refs.

The report summarizes upper atmosphere physics data by the *Upper Atmosphere Physics Monitoring System* at Showa Station in 1985. The items of observations are as follows. Geomagnetism: H-, D- and Z-components of magnetic variations, total force of the geomagnetic field, H-, D- and Z-components of magnetic pulsations. ELF-VLF wave: intensities at 0.35, 0.75, 1.2, 2, 4, 8, 30, 60 and 95 kHz, wide-band signal of ELF-VLF emissions. Ionosphere: cosmic noise absorption at 30 MHz. Aurora: meridian scanning record of OI 5577 Å and H(beta) 4861 Å, auroral intensity of 1NG N2+ 4278 Å at three directions (30 deg poleward, zenith and 30 deg equatorward). An outline of the monitoring system, instrumentation and data format, and the format of the compiled digital data are included. Appendix 1 presents daily continuous computer plots of magnetograms of Showa from Jan. 1 through Dec. 31, 1985. Appendix 2 presents frequency-time spectra of the H-component of magnetic pulsations in 1985.

K-36586

Sonett, C.P., Morfill, G.E., Jokipii, J.R., **Interstellar shock waves and Be-10 from ice cores,** *Nature,* Dec. 3, 1987 330(6147), p.458-460, 22 refs.

The anomalously high concentrations of Be-10 in antarctic ice cores, uncorrelated with delta O-18, are consistent with an increase in the atmospheric cosmic ray (CR) flux from CR acceleration in propagating interstellar shock waves, which envelop the heliosphere and whose source may be ancient supernovas. This mechanism is an alternative to the model where decreases in geomagnetic field intensity, associated with geomagnetic reversals, periodically enhance the CR flux at the top of the atmosphere. That CR variations attributable to interstellar events such as supernova shock waves have so far not been observed in the CR record is a long-standing issue. If the interpretation of the Be-10 spikes is correct, it marks the first such observation. The possibility that 'direct' observation of the interstellar medium can be made using the Be-10 record would be an important adjunct to the study of cosmic rays in the interstellar medium. (Auth.)

K-36621

Ono, T., **Aurora observations at Syowa Station in 1984,** *Polar news,* July 1985 No.41, p.19-23, In Japanese.

The 25th JARE party made a comprehensive auroral observation during the winter in 1984 using ordinary and advanced observation systems. The all sky camera (ASC) at Showa Station gives one of the highest quality of all sky films among auroral observatories in the world using a fish eye lens with F=1.4. The ASC observation was started on Feb. 25 and ended on Oct. 13, 1984. Photometric observations were carried out by using fixed directional photometers and scanning photometers at wavelengths of 4278 Å, 5577 Å and 4861 Å. All sky auroral images were observed by a highly sensitive panchromatic TV camera. These TV images were found to be very useful for a monitor of auroral activity especially for auroral experiments such as sounding rockets. Monochromatic auroral images were successfully observed by using a charge coupled device TV camera at principal auroral emission lines such as 6300 Å (OI), 5577 Å (OI), 4861 Å (Hbeta) and 4278 Å (1N N2+). Obtained data were recorded in digital form according to a PCM format. Photographs and diagrams of some of the instruments are included.

K-36622

Ejiri, M., **Rocket shooting into aurora australis in 1984,** *Polar news,* July 1985 No.41, p.24-28, In Japanese.

Three sounding rockets were launched in 1984 from Showa Station into different types of aurora, designated as AURORA I (an active auroral arc at the substorm expansion phase), II (a stable arc prior to the substorm onset), and III (a diffuse aurora during the recovery phase). A new low-light-level television camera was used to take an auroral picture downwards from the spinning rocket, together with electrostatic quadrispherical and magnetic electron spectrometers to measure the energy spectrum of auroral particles. The instrument design of scientific payloads, launching operations and rocket flight performance records as well as preliminary results are presented.

K-36629

Sato, N., ed, **Proceedings of the Nagata Symposium on Geomagnetically Conjugate Studies and the Workshop on Antarctic Middle and Upper Atmosphere Physics,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, 325p., Refs. passim. For individual papers see I-36643 through I-36646, K-36630 through K-36642 and K-36647 through K-36651.

This volume consists of 22 papers presented at a symposium and workshop held in San Diego, California, from June 16 to 20, 1986, as a part of the XIX SCAR Meeting. The papers emphasize the importance of the observation of geomagnetic conjugacy in high latitudes, which gives useful information on the acceleration mechanism for auroral particles and generation and propagation mechanisms for plasma waves in the magnetosphere, with recent results observed at conjugate-pair ground stations such as Showa-Iceland, Siple-Quebec and South Pole-Frobisher Bay, onboard Geos-I and -2 satellites, and results of simulation studies for thermospheric behaviors in the Northern and Southern Hemispheres. Discussion on geospace phenomena covers recent results of auroras, cosmic noise absorption, balloon observation, particle precipitations, and the Middle Atmosphere Program in Antarctica, especially the ozone depletion. (Auth. mod.)

K-36630

Nagata, T., **Research of geomagnetically conjugate phenomena in Antarctica since the IGY,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.1-45, Refs. p.42-45.

The geomagnetically conjugate relationship studies of the magnetospheric phenomena between the southern auroral zone in Antarctica and the northern auroral zone over Europe and America are historically reviewed, starting with the IGY (1957-1958) results and then summarizing key results obtained by the international cooperative research programs such as the IGC (1959), the IQSY (1964-1965), and IASY (1967-1971) and the IMS (1976-1979). The observed conjugate magnetospheric phenomena are divided into 3 topics according to the physical guiding processes for their conjugacy characteristics: auroral particle precipitation by field-line guidance, resulting in visual auroras, auroral X-rays, cosmic noise absorption (CNA) by the ionosphere and polar magnetic substorms; field-aligned propagation of whistler-mode plasma waves, which cover the ELF and VLF magnetospheric plasma waves that are often bouncing along the field lines between the conjugate ionospheric areas; and the hydromagnetic resonance system of the earth's magnetosphere, which covers most parts of the conjugate characteristics of Pc 3-5 hydromagnetic waves. (Auth.)

K-36631

Ono, T., **Temporal variation of the geomagnetic conjugacy in Syowa-Iceland pair,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.46-57, 18 refs.

The locations of geomagnetically conjugate points of Showa and Iceland were examined by using geomagnetic field models with internal and external magnetic fields. A large secular excursion of the magnetic conjugate point was shown from 1960 to 1990 by tracing the IGRF geomagnetic field lines. The conjugate point of Showa Station moved from a south-west area to a middle-north region in Iceland during the last 30 years. The seasonal and daily variations of conjugate points show that the excursion of the conjugate footpoint is minimum around midnight in equinox seasons and maximum around summer and winter solstice seasons. (Auth.)

K-36632

Sato, N., Saemundsson, T., **Conjugacy of electron auroras observed by all-sky cameras and scanning photometers,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.58-71, 16 refs.

Simultaneous auroral observations were carried out at the Showa-Husafell conjugate pair of stations Aug. 28-Sep. 30, 1984. The following conjugate auroral data were obtained on 4 nights of clear sky: auroral breakups occur almost simultaneously in the Northern and Southern Hemispheres; the poleward expansion speed is much larger at Showa than at Husafell; the east-west (EW) aligned auroral arcs appear at almost the same geomagnetic latitude in the IGRF model in both hemispheres; the EW-aligned auroras observed at Husafell show a large longitudinal displacement (more than 300 km westward) relative to those observed at Showa; isolated north-south aligned auroras show a good conjugacy in their shapes and locations; and the EW-aligned auroras generally show different movements and fine structures in the two hemispheres. (Auth. mod.)

K-36633

Fujii, R., **Conjugacy of rapid motions and small-scale deformations of discrete auroras by all-sky TV observations,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.72-80, 16 refs.

Simultaneous observations of discrete auroras were made on Sep. 26, 1984 by means of all-sky TV cameras at a geomagnetically conjugate pair of sites: Showa Station and Husafell. Before the onset of a small substorm conjugate faint discrete auroras were identified in both conjugate areas despite a small displacement (0.5 deg) in invariant latitude (the southern aurora is 0.5 deg higher than the northern); a striking dissimilarity of the conjugate auroras is noted in small-scale structures within the auroras, the northern discrete aurora being rather homogeneous and the southern being a rayed one; during the substorm the east-west movement and/or extension of discrete auroras was quite conjugate and simultaneous; the vortex-like structures such as folds on the discrete auroras were not always simultaneously observed at both places; even if they appeared simultaneously, their sizes seemed to be different between the conjugate regions, suggesting that the large-scale structures and their movements are mainly controlled by some conditions in the magnetosphere, perhaps near the equatorial region, but the small-scale structures such as vortices are greatly due to local acceleration processes between the magnetosphere and the ionosphere. (Auth.)

K-36634

Helliwell, R.A., **VLF wave injection, experiments from Siple Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.81-92, 17 refs.

The background of VLF wave-particle experiments from Siple Station, including wave-induced precipitation, is briefly reviewed. Single frequency ducted signals that exceed a certain 'threshold' intensity are observed at the conjugate point (Roberval, Quebec) to be amplified 30-50 dB, with temporal growth rates of 30-200 dB/s. Following saturation, variable frequency emissions are triggered. When a second signal is added to the first, with a frequency spacing $Df < 100$ Hz, signal growth is reduced and sidebands are generated at frequencies separated from the carriers by integer multiples (up to 7) of Df. The sidebands are attributed to short emissions triggered by the beats between the two input carriers. Mid-latitude magnetospheric hiss is crudely simulated by a sequence of 10 ms pulses whose frequencies are chosen randomly within a 400 Hz band. Results show that certain combinations of 10 ms pulses link together to form chorus-like elements, suggesting a common origin for hiss and chorus. Under conditions of strong echoing, emissions may form into lines; a recent example, started by the Siple Station transmitter, exhibits interline spacings of about 45 Hz. (Auth. mod.)

K-36635

Gendrin, R., **Magnetic conjugacy as observed at the apex of field lines: Geos-1 and -2 results,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.93-120, Refs. p.116-120.

This article deals with the relationships which exist between phenomena occurring at the apex of field lines, as detected by the European spacecraft Geos-1 and -2, and those occurring at their foot prints, as observed by ground-based balloons and rocket (GBR) techniques. Such simultaneous observations have allowed to obtain a more quantitative description of already known phenomena and to discover some new ones. The following topics are discussed: generation and propagation characteristics of ion cyclotron waves (ICW) in multi-component plasmas, quasi-linear interaction between VLF hiss and energetic electrons, cold plasma behavior in the equatorial plasmasphere and its relationship with the global magnetospheric convection, existence of small-scale intense field-aligned currents (FAC). (Auth. mod.)

K-36636

Lanzerotti, L.J., **Conjugate studies of hydromagnetic waves,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.121-133, Refs. p.131-133.

Geophysical studies at conjugate points on the surface of the Earth have played an important role in discovering and elucidating plasma processes in the Earth's magnetosphere. This paper discusses early studies of hydromagnetic waves at conjugate points, including some of the important work of Nagata and his colleagues and students, and bricfly reviews selected important work of the last decade and

notes where some advances can be expected in the future at very high and very low latitudes. (Auth. mod.)

K-36637

Rees, D., Fuller-Rowell, T.J., **Hemispheric asymmetries in thermospheric structure and dynamics,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.134-160, Refs. p.158-160.

Viewing the earth from a satellite, the longitudinal and universal time variations of the thermosphere and ionosphere are far more spectacular in the southern polar thermosphere and ionosphere than in the northern polar regions. The southern polar cusp is a localized region of intense forcing with a diurnal migration in geographic latitude from 55 deg to the southern geographic pole. At times of major geomagnetic disturbances, the combination of the equatorward expansion of the auroral oval and the greater offset of the southern geomagnetic pole from the rotational pole causes dramatic effects in southern mid-latitude and near-equatorial regions. A survey of recent satellite data is presented, highlighted by simulations using a global theoretical model, to demonstrate the causes of these hemispheric asymmetries. Future complementary ground-based and space measurements can exploit the hemispheric asymmetries to clearly identify geomagnetic forcing mechanisms. The greater UT and latitudinal modulation in the Southern Hemisphere may be used to identify sub-auroral excitation of the thermosphere and ionosphere during major storms. (Auth. mod.)

K-36638

Rosenberg, T.J., **Cosmic noise absorption at South Pole and Frobisher Bay: initial results,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.161-170, 5 refs.

A 30 MHz riometer was installed at Frobisher Bay, Canada, in July 1985 to enable conjugate studies of cosmic noise absorption (CNA) phenomena to be performed in conjunction with observations from Amundsen-Scott South Pole Station. The riometer data reveal a variety of temporal associations between disturbances appearing in opposite hemispheres which are generally consistent with observations at these sites reported previously; fluxgate magnetometer data from both locations aid in interpreting the observed phenomena. In particular, absorption events and intense electrojet currents in the dusk sector were found to occur preferentially in one hemisphere (mainly at the South Pole during the period July-Sep. examined here). Because the magnetometer can sense the presence of electrojets far from its immediate vicinity, these cases appear to be evidence of nonconjugate electron precipitation (perhaps occurring on open field lines) or of the severe distortion of the magnetic field line topology in this local time region. Absorption in the noon sector is characterized by long-period modulations in the Pc 5-6 range. (Auth. mod.)

K-36639

Krishnaswamy, S., Rosenberg, T.J., **Modulated ionospheric absorption unaccompanied by signficant geomagnetic pulsations,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.171-182, 15 refs.

Long-period (Pc 4-5) modulations of ionospheric cosmic noise absorption (CNA) at Siple Station are rarely seen unaccompanied by pulsations in the local geomagnetic field. Conjugate modulations of about 2 min period lasting about one hour were recorded near local noon by riometers at Siple and Roberval on Oct. 30, 1983. The Siple magnetometer records show little evidence of pulsations at this time. The absence of a ground magnetic signature implies that if such events are caused by ULF hydromagnetic waves (e.g., a field line resonance), the waves are highly localized and effectively screened by the ionosphere. In addition, the possible existence of a recurrent particle precipitation structure in space was suggested by observations of absorption modulations with periods of 10-15 min which occurred on several days at about the same time of day. These modulations were also generally unaccompanied by magnetic pulsations. (Auth.)

K-36640

Smith, A.J., **Whistler mode signals from VLF transmitters, observed at Faraday, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.183-195, 26 refs.

The Doppler shift, one-hop group travel time and arrival direction of whistler mode signals from the NAA (24 kHz) and NSS (21.4 kHz) VLF transmitters in eastern U.S.A. have been measured in the conjugate region, at Faraday Station. Two identical narrow-band receivers, of the type described by N.R. Thomson (1981), were used. Ducted whistler mode signals from both transmitters were observed every night during Feb.-Mar. 1986, usually with multi-duct structure evident. Such structure was generally similar for the two transmitters, indicating propagation along a common set of ducts. This permitted the determination of the L values of the ducts without reference to natural whistler data. Typical one hop group travel times were in the range 300-900 ms and Doppler shifts in the range -500 mHz to +500 mHz. Most ducts could be tracked for several hours, and during the night their associated group travel times often exhibited a steady decrease followed by a steady increase. This drift reversal occurred at about 02 LT and was accompanied by a rapid change from positive to negative Doppler shifts. (Auth. mod.)

K-36641

Rycroft, M.J., **Electrodynamics and magnetohydrodynamics of geospace,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.196-215, 30 refs.

The rationale for undertaking research on geospace is first reviewed. Overlooking time-dependent aspects of the problem, attention is concentrated on the steady state, magnetohydrodynamic interaction of the solar wind with the magnetosphere, and on the macroscopic treatment of ionospheric convection over the polar cap. The law of the conservation of magnetic flux out of the southern polar cap into the interplanetary medium is applied, as it is for the flux into the northern polar cap from interplanetary space above the ecliptic plane. Some recent radar results are mentioned, and some suggestions made for further experimental research, both in space and from the ground in the polar regions. (Auth.)

K-36642

Gledhill, J.A., **Particle precipitation patterns in southern hemisphere high latitudes, longitude dependence,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.216-228, 25 refs.

Measurements of precipitating electron and proton fluxes in the Antarctic are reviewed. It is evident that the South Atlantic Anomaly and the large displacement of the south geomagnetic pole from the geographic pole are the dominating factors determining the distribution of particle precipitation in longitude. Most observations of energy spectra and pitch angle distributions have been averaged over longitude and are usually given in terms of magnetic coordinates thus losing interesting data from the geographical point of view. It is suggested that it would be worth the effort to re-analyze existing data to look for spectral and pitch angle dependence on longitude in the south polar regions. A short summary of the asymmetry between the north and south polar caps is also given. (Auth.)

K-36647

Berkey, F.T., Sojka, J.J., Jarvis, M.J., **First results from a comparison of ground-based ionospheric measurements in the Southern Hemisphere and the USU global ionospheric model,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.278-286, 14 refs.

Two *F*-layer parameters have been derived from measurements made for quiet days during the austral summer and winter of 1982 at Siple and Halley stations. Even under quiet conditions, systematic differences in both parameters can be observed at the 2 sites. Insight into the source of these differences can be obtained from a comparison of the ionospheric data with theoretical data derived from the USU global ionospheric model. Under austral winter conditions, a relatively good model-observational comparison is obtained. However, for austral summer conditions this agreement is poorer, apparently due to the simplicity of the neutral wind incorporated into the ionospheric model. (Auth. mod.)

K-36648

Krishnaswamy, S., **Statistics of auroral radio absorption at Siple and South Pole,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.287-297, 7 refs.

Analysis of cosmic noise absorption data from South Pole and Siple, (a pair of stations on opposite sides of the latitude of maximum auroral activity) has revealed important differences in the statistics of auroral radio absorption at the two locations. At Siple, there is a general tendency for summer absorption levels to be higher than the absorption in winter (especially around local magnetic noon), but the data (1975, 1980, 1982) show significant year-to-year variations in the diurnal patterns of absorption. The diurnal patterns at South Pole also exhibit year-to-year variations (1982-1985) but they are very different from those at Siple, and the winter/summer relationship also changes from year to year. A second difference has to do with the occurrence statistics: while at Siple the occurrence-frequency distribution departs significantly from a log-normal relation, the South Pole distributions are closer to a log-normal and the two sets of distributions can have substantially different trends above about 1 dB. Comparison with seasonal and annual means of the geomagnetic *Ap* index suggests that auroral absorption at Siple is more strongly correlated with *Ap* than is absorption at South Pole. (Auth. mod.)

K-36649

Mendes da Costa, A., Rizzo Piazza, L., **PCA effects on a VLF transantarctic propagation path,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.298-312, 27 refs.

A study is presented of polar cap absorption (PCA) events from Sep. 1967 to Nov. 1974 and their effects on phase records of very low frequency (VLF) signals on NWC (Australia-Brazil) propagation path, crossing Antarctica. Nearly 50 PCAs of different intensities were studied and analyzed in detail. A good correlation between nighttime VLF signal phase advances and total proton flux content of energy 10 MeV $<$ E $<$ 30 MeV measured by satellites was obtained for strong PCA events. Geomagnetic storms with sudden commencement, associated or not with proton precipitation, also produce well defined VLF signal phase advances. Comparison of these results with those obtained in the Northern Hemisphere during PCA events may provide relevant information on the behavior of the ionospheric *D*-layer over the antarctic region. (Auth. mod.)

K-36650

Bering, E.A., III, **1985-1986 South Pole balloon campaign,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.313-317, 7 refs.

This paper provides an overview of the University of Houston—University Park/University of Maryland—College Park balloon program that was carried out at Amundsen-Scott Station, during the 1985-1986 austral summer. The paper emphasizes objectives, instrumentation and operations. The quality of the data and periods of special interest are discussed. The primary experimental tools used in this program were unmanned stratospheric balloon payloads. In the month starting on Dec. 16, 1985 and ending Jan. 16, 1986, 8 successful balloon flights were conducted, ranging in duration from 6 to 103 h 30 min. A total of 468 h 30 min of data were obtained under a wide range of magnetic conditions. (Auth. mod.)

K-36651

Foppiano, A.J., **Ionosonde measurements at Marsh, King George Island: first results,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1987 Special issue No.48, p.318-322, 2 refs.

Routine ionospheric vertical-incidence soundings were started on Feb. 15, 1986 at 1615 LT at Marsh Station using an IPS 42 model ionosonde coupled to Delta antennae. Sample ionograms are shown indicating the range of phenomena that can be observed. Conspicuous traces likely to be related to interference from a nearby ionosonde are discussed. (Auth.)

K-36686

Carpenter, D.L., **Whistler studies of the plasmasphere shape and dynamics,** *Advances in space research,* 1986 6(3), p.5-19, 55 refs.

DLC QB495.A38

Whistler studies of the plasmapause/plasmasphere are traced from their beginnings during the IGY through the early 1960's, when extensive data from Antarctica became available. Highlights of this period include discovery of the 'knee' in the equatorial electron density profile, initial comparisons with results from the Lunik probes, identification of magnetic storm effects, and discovery of the duskside bulge. In the mid-1960's, whistlers provided the first evidence of cross-L plasma drift patterns in the outer plasmasphere. From a present day perspective, the plasmasphere is seen as a region penetrated, by the unsteady component of high latitude electric fields. In the predawn sector, post substorm outward drifts may be an after effect of the shielding of the plasmasphere against the steadier components of the substorm electric fields. The available indirect whistler evidence of plasmasphere erosion during large disturbances suggests that erosion occurs primarily in the dusk-premidnight sector. (Auth.)

K-36687

Hansen, H.J., Scourfield, M.W.J., Rash, J.P.S., **Correlated pulsations in auroral light intensity and narrow band VLF emissions,** *Advances in space research,* 1986 6(3), p.227-230, 8 refs.

DLC QB495.A38

Observations at Sanae Station of pulsating aurora with a low light level TV system have been combined with simultaneous records of narrow band VLF emissions. Both auroral light and VLF intensities display a significant peak around 1.3 Hz in the power spectrum. The peaks in the auroral light intensity variations lead those in the VLF by times between zero and 200 ms, as revealed by cross-spectral analysis. Furthermore the 4 kHz VLF component leads the 3.5 kHz component by zero to 100 ms. These results are explained in terms of cyclotron resonance between the auroral electrons and VLF in a region displaced 8000 km from the equatorial plane. (Auth.)

K-36731

Kokubun, S., **Dayside auroras,** *Polar news,* Jan. 1987 No.44, p.2-9, In Japanese.

Auroral phenomena in the dayside region attract recent attention in the study of the magnetosphere, as direct information sources for

the solar wind-magnetosphere interaction. Satellite observations have revealed the interesting characteristics that the activity of dayside auroras are not always correlated with the auroral substorm initiated in the midnight region. In this article recent topics of auroral observations are reviewed with an emphasis on the features of auroral display in the dayside region observed both on the ground and with satellites.

K-36765

Craven, M., Essex, E.A., **Diurnal, seasonal and storm-time variability of the total electron content of the ionosphere north of Macquarie Island,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Dec. 1987 No.56, 40p., 20 refs.

Presented are measurements taken near solar minimum of the total electron content (TEC) of the ionosphere equatorward of Macquarie I. using the Faraday rotation techniques. The data indicate that the peak in daytime TEC maximizes around late autumn, progressively decreases through winter to spring, and gradually recovers with the onset of summer. The morning post-sunrise build up phase of TEC becomes progressively less uniform from winter through summer, whilst the post-sunset TEC decay phase is often disrupted, during all seasons, by the onset of geomagnetic disturbances and/or the passage of the ionospheric trough. Magnetic storm events are often accompanied by a large increase in TEC lasting several hours, with increased geomagnetic activity on successive evenings, and a general reduction of daytime TEC levels during the storm recovery phase over 2-3 days. The largest percentage increases in TEC generally occur around the time of the minimum value of the Dst-index. (Auth.)

K-36769

Bremer, J., **Control of particle precipitation into the middle atmosphere by regular changes of the interplanetary magnetic field,** *Gerlands Beiträge zur Geophysik,* 1987 96(3/4), p.362-371, With German and Russian summaries. 11 refs.

Negative *Bz* components induced by the interplanetary magnetic field (IMF) in the solar-magnetospheric coordinate system should favor precipitation of high energetic particles into the middle atmosphere whereas positive *Bz* values should inhibit such precipitation. In high subauroral and auroral latitudes this expected dependence of particle precipitation on IMF structure can be confirmed. In mid-latitudes, however, the most important precipitation events, the so-called after effects after strong geomagnetic disturbances, are only partly controlled by IMF sector structure. In particular, during the second part of the after effect after the main phase, internal magnetospheric loss processes which seem to be independent of solar sector structure play a dominant role. (Auth.)

K-36843

Hamilton, R.A., Gough, H., **Studies of standing-wave geomagnetic pulsations in the magnetosphere,** *British Antarctic Survey. Bulletin,* Nov. 1987 No.77, p.131-143, 7 refs.

An analysis has been made of the power spectra of Pc3 and Pc4 geomagnetic pulsations recorded at Halley Bay, St Anthony, Newfoundland, and at South Georgia. Halley Bay and St Anthony are geomagnetically conjugate stations on the L=4.2 magnetic shell and South Georgia is situated on the same geomagnetic longitude as these two stations, but at a lower L-value of 1.8 The power spectra of the pulsations recorded at the conjugate stations show that at any one time there may be several standing hydromagnetic waves on a particular shell, and that the frequencies of the oscillations differ from the expected natural oscillation frequency of the field line. On many occasions similar maxima are also observed in the power spectra of the pulsations recorded at the lower-latitude station, South Georgia. It is suggested that, on most occasions, the characteristics of the pulsations observed on the ground are mainly due to the travelling fast-mode hydromagnetic waves in the magnetosphere rather than standing waves on individual field shells. (Auth.)

K-36898

Arshinkov, I.S., **Magnetic field measurements in the ionosphere-magnetosphere region,** *Advances in space research,* 1986 6(9), p.111-114, 9 refs.

An analysis of the differences between the magnetic field intensities, as measured by the Intercosmos Bulgaria 1300 satellite and computed from the IGRF-1980 values, is presented. On a global scale the residuals are negative. A 75 nT spacecraft remanent magnetic field along the X-axis is determined. It is found difficult to explain the negative residuals in the polar region by a magnetization along any of the axes. The complex character of the differences in this region is conditioned by the external fields, in particular, by the ionospheric current systems. It is suggested that the bias fields from the spacecraft have a static character and are found mainly along the X-axis. (Auth. mod.)

K-36903

Lin, N.G., Cahill, L.J., Jr., Engebretson, M.J., Sugiura, M., Arnoldy, R.L., **Dayside pulsation events near the plasmapause,** *Planetary and space science,* Feb. 1986 34(2), p.155-181, Refs. p.179-180.

DLC QC801.P5

Four dayside pulsation events were observed from DE-1 near the equatorial plasmapause region on Aug. 23 and 24, Sep. 30 and Oct. 10, 1982. The corresponding ground data from Siple for three of them are presented and compared to the DE-1 data. The concept of field line resonance is applied to interpret the standing wave structure of the events. Most of the events exhibit complicated wave forms with transverse and compressional components seen simultaneously on the same field shell. For the long period waves a possible energy source is the Kelvin-Helmholtz instability at the magnetopause, while the radially polarized Pc 4 seen on Oct. 10 was attributed to bounce resonance excitation. "Wave bursts" (short intervals of 5-10 or more-cycles) were seen in almost all frequency ranges. The brief duration may be due to temporal or spatial variation of wave sources. A clear tendency of continuously decreasing wave period with decreasing L value was seen in many cases. This is attributed to the broad band frequency of the wave source which excites individual magnetic shells oscillating at their own eigenfrequencies. (Auth. mod.)

K-36904

Belon, A.E., **Conjugacy of visual auroras during magnetically quiet periods,** *Journal of geophysical research,* Jan. 1, 1969 74(1), p.1-28, Refs. p.27-28.

DLC QC811.J6

The spatial and temporal conjugacy of auroras at high latitudes has been investigated by flights centered about magnetic midnight on Mar. 12, 14, and 16, 1967. A visual examination of all the data and a quantitative analysis of selected film frames indicate that, within the limits of error in the measurements and aircraft navigation, all the observed auroras were conjugate according to the CSFC 12/66 model of the *main* geomagnetic field. In most cases when the relative positions of aircraft and aurora were the same in both hemispheres, the conjugate auroras exhibited remarkably detailed similarity (point conjugacy) in their shape, intensity, and in their spatial and temporal variations. There is a tendency for the southern auroras to be located slightly eastward of the northern conjugate auroras. Preliminary results from similar conjugate flights conducted during Mar. 1968, a magnetically disturbed period, are briefly described. A visual inspection of these data has revealed substantial deviations in auroral conjugacy and a considerably more complex behavior of particle precipitation than that occurring during magnetically quiet periods. (Auth. mod.)

K-36905

Tonegawa, Y., **Spectral characteristics of Pc 3 and Pc 4/5 magnetic pulsation bands observed near L=6,** *Journal of geophysical research,* Nov. 1, 1984 89(A11), p.9720-9730, Refs. p.9729-9730.

DLC QC811.J6

From dynamic spectral analysis of magnetic pulsations observed at Showa and Mizuho it is found that there are two predominant spectral bands throughout the daytime, one in the Pc 3 range with frequencies of about 20-80 mHz and the other in the Pc 4/5 range with frequencies of about 3-10 mHz. At synchronous orbit, corresponding spectral bands were seen in the azimuthal component with a harmonic structure when the satellite was located at the off-magnetic equator. The result suggests that the 3- to 10-mHz band is the fundamental mode of standing shear Alfvén waves and the 20- to 80-mHz band is the higher harmonics. However, both bands were not always enhanced simultaneously. Switching of activity between both bands was frequently observed on magnetically quiet days. This result indicates that the Pc 3 and Pc 4/5 bands are excited by different external driving sources. (Auth. mod.)

K-36912

Matthews, J.P., **Observations of the VLF quiet band phenomenon,** *Journal of geophysics,* 1986 60(1), p.63-67, 18 refs.

In 1979, VLF receivers were operated near Roberval, Canada, by a team from the Japanese Institute of Space and Astronautical Science. Data obtained from this experiment on July 23 near 12.16 UT show one-hop signals at just below 3 kHz, originating from the VLF transmitter located at Siple Station. On the low-frequency side of the Siple signals, a 'quiet band' of background noise suppression is visible, approximately 95 Hz in width. The time taken for the effect to develop is between 5 and 10 s and the recovery time of the noise is 20 s or more. The level of suppression is 3 dB. The important aspect of these data is that, although growth is enhanced above the frequency of the Siple signals, on the lower border of the quiet band little or no enhancement is observed, in contrast to some theoretical models. (Auth.)

K-36916

Arnoldy, R.L., Kaufmann, R.L., Cahill, L.J., Jr., Mende, S.B., **Pc 1 pearl-electron interactions on the L=4.2 magnetic shell,** *Geophysical research letters,* Aug. 1983 10(8), p.627-630, 11 refs.

A number of examples of auroral light bursts correlated with Pc 1 "pearl" wave packets have been recorded at Siple Station. The events are unique in that an individual light burst occurs at Siple not when the wave packet is recorded at Siple but rather when the wave is measured to be at the conjugate point over Roberval, Quebec. Although one can fit the observations to a model where ions are precipitated from an interaction region near the equator via cyclotron resonance, the number of ions required to produce the light and the above mentioned light burst-ULF wave phase relationship both make the precipitation of electrons a more plausible interpretation. The processes involved in this interpretation are set forth and discussed. (Auth. mod.)

K-36917

Bell, T.F., Inan, U.S., Helliwell, R.A., **Nonducted coherent VLF waves and associated triggered emissions observed on the ISEE-1 satellite,** *Journal of geophysical research,* June 1, 1981 86(A6), p.4649-4670, 31 refs.

During the period Oct. 1977-Aug. 1979, the Stanford VLF receiver on ISEE-1 acquired data on approximately 90 separate orbits in the plasmasphere in which the satellite longitude lay within 30 deg of the magnetic field lines linking the North Dakota Omega transmitter. During 12 passes the nonducted Omega signals at 10.2 kHz were observed to trigger VLF emissions on magnetic shells ranging from L=1.8-3.8. The emission characteristics often differed significantly from those of emissions triggered by ducted signals and detected at ground stations. In many cases each of the triggered signals consisted of a large array of discrete rising tones whose rate of change of frequency approached 40 kHz/sec. Unusual emission activity involving signals from the Siple Station transmitter was also observed on two occasions outside the plasmasphere. The results indicate that the emission generation process can take place under much more general conditions than previously believed. (Auth. mod.)

K-36918

Kuwashima, M., **Spectral characteristics of magnetic Pi 2 pulsations in the auroral region and lower latitudes,** *Journal of geophysical research,* June 1, 1981 86(A6), p.4686-4696, 76 refs.

The spectral characteristics of magnetic Pi 2 pulsations are studied in detail using data obtained simultaneously over a wide latitudinal range from the auroral region (L=7.5) through low latitudes (L=1.8). Pi 2 is revealed to be observed almost simultaneously with the onset of a substorm expansion over the wide latitudinal range with the common predominant period. The Pi 2 amplitude shows a primary maximum at the auroral oval and an additional secondary maximum near the plasmapause. The Pi 2 period generally becomes shorter (longer) when the associated auroral breakup starts at lower (higher) latitudes. Pi 2 is also observed simultaneously at a pair of conjugate stations in the auroral region with similar waveforms. These observational results support the torsional oscillation model which suggests that Pi 2 is caused by the hydromagnetic torsional oscillation of the geomagnetic field line anchored on the auroral oval. (Auth.)

K-36919

Arnoldy, R.L., Lewis, P.B., Jr., Cahill, L.J., Jr., **Polarization of Pc 1 and IPDP pulsations correlated with particle precipitation,** *Journal of geophysical research,* Dec. 1, 1979 84(A12), p.7091-7098, 27 refs.

The correlation of Pc 1 and IPDP pulsations with particle precipitation shows that the waves are left (L) polarized when observed simultaneously with precipitation. This is consistent with theoretical understanding of the generation of the pulsations as an L wave in the magnetosphere and the L wave propagation through the ionosphere with horizontal ducting of the R wave. It is suggested that L polarization of Pc 1 and IPDP locates the ULF source field line. Three events studied were IPDP correlated with riometer absorption. The observations strongly support the inward convecting source model for the generation of IPDP. On the other hand, the origin of the particles (presumably electrons) responsible for the riometer absorption is still an open question. Finally, a very long duration Pc 1 (HM emission) event is presented where L polarized wave packets were very closely correlated with auroral light bursts measured at 4278 Å wavelength.

K-36920

Fukunishi, H., **Latitude dependence of power spectra of magnetic pulsations near L=4 excited by scc's and si's,** *Journal of geophysical research,* Dec. 1, 1979 84(A12), p.7191-7200, 25 refs.

Observational evidence from a latitude array of three ground-based magnetometer stations extending from L=3.2 to L=4.4 indicates that the damped-type oscillations excited by storm sudden commencements and sudden impulses contain many spectral peaks. Each spectral peak appears to have a different localization in latitude. The localization in latitude is quite different for the latitudinal and azimuthal *(H and D)* components. The conjugate magnetic data show that the *H* components oscillate in phase, while the *D* components oscillate out of phase at the conjugate pair stations. These observational facts are discussed using a theoretical result concerning

the response of the magnetosphere to an impulsive driving force. (Auth.)

K-36921

Andrews, M.K., Lanzerotti, L.J., Maclennan, C.G., **Rotation of hydromagnetic waves between the magnetosphere and the ground,** *Journal of geophysical research,* Dec. 1, 1979 84(A12), p.7267-7270, 26 refs.

It is shown, via an analysis of ground-based magnetic field data and fixed-frequency VLF signals propagating in the whistler mode in the magnetosphere, that magnetospheric hydromagnetic waves (having periods of 60-120 s) observed on the ground have their wave ellipse orientations rotated by *pi*/2 from their orientations in the magnetosphere. This analysis provides a detailed nonstatistical confirmation of recent theoretical predictions of the rotation effect of the ionosphere/atmosphere/ground on hydromagnetic waves. (Auth.)

K-36922

Duggal, S.P., Pomerantz, M.A., **Cosmic ray intensity pulses,** *Journal of geophysical research,* Dec. 1, 1979 84(A12), p.7343-7347, 17 refs.

Pulse variations in the galactic cosmic ray intensity, extending over intervals of several hours, have often been observed during cosmic ray storms as well as during other periods. On some occasions, these pulses appear in the data recorded at polar stations during epochs characterized by enhanced diurnal anisotropy at low latitudes. The short-term intensity increase at polar stations cannot be ascribed solely to the azimuthal anisotropy, and it is demonstrated that the cosmic ray transport during a pulse displays both azimuthal and north-south anisotropies. Furthermore, it is found that the magnitude of the pulse height recorded by a station is proportional to the exponential function *e* sup cosine of the angular separation between the mean asymptotic direction of viewing of the station and the direction of anisotropy in three-dimensional space. The relationship between pulse modulations and transient disturbances in the interplanetary magnetic field, and especially their location, remain to be investigated. (Auth.)

K-36923

Duggal, S.P., Pomerantz, M.A., **Enhanced isotropic cosmic ray intensity waves during cosmic ray storms,** *Journal of geophysical research,* Dec. 1, 1979 84(A12), p.7382-7385, 32 refs.

A study of the abnormal cosmic ray storm that followed the solar particle ground level event (GLE) on Sep. 23, 1978, has revealed that the protracted recovery phase is impregnated with wavelike modulations that are associated with the rotational period of the sun. The analysis of data from the global network of stations has demonstrated that these large-amplitude waves are isotropic. From an analysis of axial and longitudinal anisotropies it is concluded that the observed fluctuations did not originate from periodic changes in the cosmic ray density gradient, either in or perpendicular to the plane of the ecliptic. Although these long-duration waves cannot be ascribed to singular features on the sun, it is speculated that they may reflect changes in the topology of active regions on the visible disk. In any case, it is clear that the scope of the classical picture, in which Forbush decreases are associated with short-term anisotropies, must be expanded to include long-duration wave phenomena. These new observations provide an important clue in understanding the physical mechanism that gives rise to long-duration cosmic ray storms. (Auth.)

K-36965

Stoker, P.H., **Riometer absorption and spectral index for precipitating electrons with exponential spectra,** *Journal of geophysical research,* June 1, 1987 92(A6), p.5961-5968, 22 refs.

The altitude profiles computed in the mid 1970s for energy deposition in the atmosphere by electrons and electron-produced X rays are transformed to electron density profiles in order to calculate the absorption of cosmic radio noise at 20, 30 and 51.4 MHz. The electrons are precipitated isotropically over the downward hemisphere with exponential spectra having e-folding energies of 10, 50 and 200 keV. Relationships between parameters measured by the riometer or derived from those measurements are discussed. The absorption event recorded at Sanae, Antarctica, on June 27, 1982, at 0122 not only illustrates that the spectral index *n* is not a unique parameter when electron precipitation is not uniform in the field of view of a riometer antenna but suggests also highly wavelength selective scattering of cosmic radio noise from the more luminous parts of the radio sky. (Auth. mod.)

K-37010

Candidi, M., Meng, C.-I., **Low-altitude observations of the conjugate polar cusps,** *Journal of geophysical research,* Feb. 1, 1988 93(A2), p.923-931, 31 refs.

A set of 118 pairs of nearly simultaneous polar cusp observations over opposite hemispheres, taken by two identically instrumented satellites on orbits that are very close to each other, is used to determine the morphology of the conjugate polar cusps. The general mirror image picture does not extend to the precision of a fraction of a degree in magnetic latitude (MLAT). Only 54% of the equatorial boundary observations and 32% of the poleward boundary observations are within p/m 1 deg of the conjugate location. The influences of the Earth's magnetic dipole tilt, of geomagnetic activity, and of the IMF parameters on the cusp asymmetry are investigated; no unique parameter is found to better organize the conjugacy of the two cusps. Rather, all of these parameters appear to have a slight effect on the relative locations of the opposite polar cusps. The difference in the MLATs between boundaries of conjugate polar cusp regions depends on the latitude of the cusp location. Furthermore, the projection of the boundaries of the polar cusp regions onto the ionosphere does not follow the offset circle that describes the configuration of the average auroral oval. (Auth.)

K-37011

Campbell, W.H., Schiffmacher, E.R., **Quiet ionospheric currents of the Southern Hemisphere derived from geomagnetic records,** *Journal of geophysical research,* Feb. 1, 1988 93(A2), p.933-944, 13 refs.

This work describes the month-by-month behavior of the equivalent ionospheric current systems derived from spherical harmonic analyses of the quiet time geomagnetic field daily variations in 1965 at selected observatories representing the three southern global half-sector regions separately encompassing South America, Africa, and Australia. These external *Sq* current patterns were vortices having mid-latitude foci with midday summertime amplitudes reaching 16,-200 A above the midnight level. The wintertime amplitudes were about 10,000 A smaller. At low latitudes there was a large intrusion of the opposite hemisphere external *Sq* current system into the wintertime hemisphere at prenoon hours, displacing the primary current vortex to later postnoon hours. The behavior of the Southern Hemisphere external currents was found to be seasonally similar to that of the Northern Hemisphere for the same year. The quiet year behavior was compared to the results for the 1958 active year. The winter-to-summertime increase in focus current was similar in amplitude for the 2 years. The active year summertime and equinoctial current focus amplitudes were about 2.3 times the amplitudes of corresponding months in the quiet year. Data from these antarctic and subantarctic stations were used in this study: Argentine Islands, Eights, Byrd, Vostok, Kerguelen, SANAE, Roi Baudouin, Macquarie, Dumont d'Urville, and Wilkes. (Auth.)

K-37012
Arnoldy, R.L., Engebretson, M.J., Cahill, L.J., Jr., **Bursts of Pc 1-2 near the ionospheric footprint of the cusp and their relationship to flux transfer events,** *Journal of geophysical research,* Feb. 1, 1988 93(A2), p.1007-1016, 45 refs.

Ground-based induction antennas at high latitudes measure a magnetic signature which can be modeled as the ground signature of a moving, large vortex of ionospheric Hall current. This Hall current is believed to be generated by the field-aligned current in a helical flux tube that has been reconnected: a flux transfer event (FTE). These possible FTEs are seen predominantly by ground stations near the dayside cusp, although similar signatures can be found near the plasmapause and in the polar cap. A significant result obtained from the induction antennas is that for about 60% of the cusp FTEs there are coincident Pc 1-2 pulsations. Pc 1-2 pulsations measured near the plasmapause which occur simultaneously with the cusp Pc 1-2 coincident with FTEs pose some questions about the generation of the Pc 1-2 and whether the FTE signatures may not simply be the result of solar wind pressure impulses on the magnetopause. Data for this study is from records made at Sondre Stromfjord, Greenland and Amundsen-Scott Station at the South Pole. Comparisons are made from observations taken at both stations. (Auth. mod.)

K-37051
Morris, R.J., Cole, K.D., **Pc3 magnetic pulsations at Davis, Antarctica,** *Planetary and space science,* Nov. 1987 35(11), p.1437-1447, 27 refs.

A brief morphological study of Pc3 (10-45 s) ULF magnetic pulsations observed at the polar cusp latitude Davis Station is presented. A significant observation of these deeply amplitude-modulated near monochromatic Pc3 magnetic pulsations is their large amplitudes, which may provide a ground diagnostic for the location of the last closed magnetic field lines, adjacent to the dayside polar cusp. Observational analyses include both diurnal and seasonal amplitude and occurrence distributions, power spectral analyses, dynamic sonograms and polarization studies. (Auth.)

K-37134
Cazeneuve, H., Grinspon, Y.M., **Spectral analyses of ionospheric and magnetic disturbances** [Analisis espectral de perturbaciones ionosfericas y magneticas], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1987 No.357, 25p., In Spanish with English, French and German summaries. 12 refs.

Geomagnetic and ionospheric activities during disturbed conditions have been analyzed by applying spectral analysis techniques to data from Belgrano II Station, in the auroral zone. In order to obtain a quantitative characterization of the spectral results, the spectra were parameterized. The spectral power and slopes are found to exhibit recurrent variations, which indicate a continually varying power redistribution. The effects of the variations are felt at the station as it faces successive disturbance sectors during its daily rotation. (Auth. mod.)

K-37145
Ogawa, T., Igarashi, K., Aikyo, K., Maeno, H., **NNSS satellite observations of medium-scale traveling ionospheric disturbances at southern high-latitudes,** *Journal of geomagnetism and geoelectricity,* 1987 39(12), p.709-721, 17 refs.

From Mar. 1985 to Jan. 1986, 428 medium-scale traveling ionospheric disturbances (TID's) incident to the high-latitudes between 50 and 85S were detected at Showa Station by means of differential-Doppler measurements of the 150 and 400 MHz beacon waves from 6 NNSS satellites. Statistical analysis indicates that (1) the medium-scale TID's at high-latitudes appear quite often during geomagnetically quiet and moderately disturbed conditions, and their occurrence seems not to increase with increasing geomagnetic activity; (2) they attain the maximum activity in winter and the minimum in summer; (3) diurnal variation shows the maximum occurrence around 1400-1600 LT with a second maximum around midnight, and (4) most of the medium-scale TID's propagate from south toward the equator. These findings are compared with TID observations using NNSS made at mid-latitudes (30-55N) to find a fairly good consistency between both results. (Auth.)

K-37166
Poulsen, W.L., Inan, U.S., **Satellite observations of a new type of discrete VLF emission at L<4,** *Journal of geophysical research,* Mar. 1, 1988 93(A3), p.1817-1838, 22 refs.

Emission elements of a new type of whistler mode emission are confined to a bandwidth of 1-5 kHz, with the lower cutoff frequency of the band varying with *L* shell, being equal to about 0.2-0.5 times the equatorial electron gyrofrequency. The discrete and burstlike nature of the emissions is similar to that of chorus emissions typically observed at higher *L;* however, dispersion of individual elements is often different from typical chorus, and the emissions are observed inside as well as outside the plasmapause. The analysis of data from the low-altitude ISIS 2 and the high-altitude DE 1 satellites indicates that the emissions may be generated near the equatorial plane. Observations in the vicinity of low-altitude crossings of the plasmapause also indicate the presence of a second emission band which is interpreted to result from the reflection of the equatorially generated emissions from the lower ionosphere. Data acquisition was done at Siple Station during 1982-1983 in support of VLF wave injection experiments. (Auth. mod.)

K-37167
Persoon, A.M., **Electron density depletions in the nightside auroral zone,** *Journal of geophysical research,* Mar. 1, 1988 93(A3), p.1871-1895, 71 refs.

Measurements from instruments on board Dynamics Explorer 1 are used to study regions of diminished electron density in the nightside auroral zone. Local electron densities are obtained from the electron plasma frequency cutoff of the whistler mode auroral hiss. Electron density profiles are highly variable through the nightside auroral zone. Sharply defined regions of low electron densities are a common feature of auroral zone crossings from the predusk hours until the early morning hours at all radial distances. Electron densities in these regions are strongly depleted in relation to the adjacent polar cap and plasmaspheric densities, forming a low-density cavity at 70 deg invariant latitude. A comparison of the electron density depletions with simultaneously measured low- and high-energy particle measurements indicates a correspondence between low auroral plasma densities and upward directed ion beams and conics. Low-energy upflowing H cations are strongly correlated with the poleward edge of the auroral cavity. Peak energies of the precipitating electron population occur inside the cavity interval. These correlations show that density depletions in the nightside auroral zone are directly associated with auroral acceleration processes. Data from the Southern Hemisphere to latitude 80S were used in this study. (Auth. mod.)

K-37168
Sá, L.A.D., Helliwell, R.A., **Structure of VLF whistler mode sideband waves in the magnetosphere,** *Journal of geophysical research,* Mar. 1, 1988 93(A3), p.1987-1992, 7 refs.

An accurate determination is made of the sideband structure of ducted VLF whistler mode waves transmitted from Siple Station and observed at Lake Mistissini, Quebec. Single- and double-frequency experiments are described. It is shown that sideband spectra can be

explained by nonlinear interactions between two or more lines in the magnetosphere, the line intensities required for such interactions being low. If one of the lines is a transmitted carrier, the other line can be as much as 40 dB lower in amplitude, implying that power line radiation (PLR) can be an important factor in sideband generation. It is shown that "single-line" sidebands are due to interactions between the input wave and harmonics of 60 Hz present within the duct (assumed to be PLR), and that double-line spectra are affected by their position relative to the same 60-Hz system of lines. A study of double-line spectra as a function of line separation and line amplitude ratio is made. (Auth.)

K-37183

Sandholt, P.E., **Interplanetary and geophysical effects of a coronal transient,** *Annales geophysicae,* Aug. 1987 5(4), p.219-230, Refs. p.228-229.

This report presents a study of the flare-related coronal transient on Nov. 27, 1979, with the resulting interplanetary (IP) shock and the associated auroral and magnetic effects that were observed from the ground 72 h after the initial coronal brightening. The observed disturbance of the interplanetary magnetic field resulting from the coronal mass ejection is discussed in relation to a model description of flare-related perturbations of the solar current sheet. The power transfer from the solar wind to the magnetosphere did not rise above the threshold value for magnetospheric storm triggering in this case. Thus, the IP shock was not followed by a major storm. However, distinct signatures related to the IP disturbance were observed in the polar cusp aurora above Svalbard, in the local magnetic field and at the conjugate location in Antarctica. The relevance of the present observations for different models of plasma transfer from the magnetosheath is discussed. (Auth. mod.)

K-37184

Shea, M.A., **Cosmic ray latitude surveys in the Atlantic Ocean area,** *U.S. Air Force Geophysical Laboratory. Technical report,* 1987 AFGL-TR-87-0292, 4p., ADA-187 102, 10 refs. Reprinted from 20th International Cosmic Ray Conference, Conference Papers, 4, 201-203.

Vertical cutoff rigidities have been re-determined for the locations of the stratospheric balloon measurements made during the 22nd Soviet Antarctic Expedition (1975-1976) between the Soviet Union and Antarctica, via Africa, South America and Europe. These cutoff rigidities were determined for the month of each measurement using a method that interpolates between the world grids of trajectory-derived vertical cutoff rigidities calculated for Epoch 1965.0 and Epoch 1980.0. In comparing these with other values calculated using the 1975.0 field models which under-estimated the secular variations, small increases in the vertical cutoff rigidities were noted in the North Atlantic area and small decreases were noted in the South Atlantic, consistent with the secular changes in the world grid of vertical cutoff rigidities. These results emphasize the necessity of determining cutoff rigidity values of the year in which latitude measurements are made if these measurements are in the region of the world (particularly the Atlantic Ocean area) where the cutoff rigidity values are rapidly changing. (Auth.)

K-37188

Rees, D., **Thermospheric dynamics: understanding the unusual disturbances by means of simulations with a fully-coupled global thermosphere/high-latitude ionosphere model,** *Annales geophysicae,* Dec. 1987 5(6), p.303-328, Refs. p.327-328.

Strong geomagnetic disturbances have generated complex thermospheric disturbances and wind patterns which have been difficult to interpret using global thermospheric models. As a step towards an improved understanding of the complex disturbances, a fully self-consistent numerical model of the polar ionosphere and the global thermosphere has been developed. This model is capable of predicting the dynamical and chemical interactions between the neutral and ionospheric constituents of the polar regions in the presence of combined solar and geomagnetic forcing. In this paper, the effects of self-consistent enhancements of *E*- and *F*-region ionization and conductivity within the auroral ovals and polar regions, and the consequent response of the neutral circulation to geomagnetic forcing are discussed. The plasma densities of the auroral *E*-region are significantly enhanced even under quiet geomagnetic conditions, leading to a more consistent description of the interactions. Rather unusual and large thermospheric wind and structural disturbance patterns are observed during highly disturbed geomagnetic conditions. Future objectives for quantitative understanding and modelling of the disturbed thermosphere should be the simultaneous mapping of precipitation and convection patterns over the polar regions. (Auth. mod.)

K-37189

Thayer, J.P., **Thermospheric neutral wind signatures dependent on the east-west component of the interplanetary magnetic field for Northern and Southern Hemispheres as measured from Dynamics Explorer-2,** *Annales geophysicae,* Dec. 1987 5(6), p.363-368, 24 refs.

Vector neutral wind measurements derived from observations made on the low-altitude, polar-orbiting, Dynamics Explorer-2 (DE-2) spacecraft have been collated and analyzed to investigate the influence of the sign of the interplanetary magnetic field (IMF) east-west component *(By)* on the mean high-latitude thermospheric neutral circulation at *F*-region altitudes for the northern (winter) and southern (summer) polar regions. The results of the study include the following: in the Southern Hemisphere for negative *By* a large anticyclonic circulation cell (associated with the dusk ion-convection cell) is present in the mean wind pattern, with the region of most rapid anti-sunward flow located on the dawn-side of the geomagnetic polar cap. For positive *By* the anticyclonic circulation cell is smaller and is largely confined to the evening sector. In the morning sector for both signs of *By* the mean neutral wind pattern is influenced by ion-drag forces associated with the cyclonic (dawn) ion-convection cell, but does not exhibit a region of sunward-directed mean flow. In the southern polar region the direction of the anti-sunward polar-cap wind rotates from about 7 deg offset from the noon-midnight meridian towards dusk for *By* positive to about 15 deg offset towards dawn for *By* negative. Anticyclonic vorticity in the neutral circulation, associated with the dusk cell of ionospheric convection, is substantially greater than cyclonic vorticity associated with the dawn cell of ionospheric convection for both hemispheres, irrespective of the sign of *By*. Winds associated with the anticyclonic neutral vortex are more rapid and the vortex occupies a greater spatial area in the Northern Hemisphere when *By* is positive and in the Southern Hemisphere when *By* is negative. (Auth. mod.)

K-37190

Roble, R.G., Ridley, E.C., **Auroral model for the NCAR thermospheric general circulation model (TGCM),** *Annales geophysicae,* Dec. 1987 5(6), p.369-382, Refs. p.381-382.

A model of high latitude auroral processes has been developed for use in the National Center for Atmospheric Research (NCAR) thermospheric general circulation model (TGCM). The ion drift pattern associated with magnetospheric convection is specified by the empirical model of Heelis et al. (1982) considering offset geographic and geomagnetic poles. An analytic prescription of particle precipitation in the auroral oval is developed that enables rapid numerical evaluation of auroral ionization rates and global aurora power input. The auroral zone half-width, mean particle energy, and particle flux can all vary with magnetic local time and the latitudinal variation of particle flux is Gaussian. Illustrations of contours of electric potential (kV) and E x B ion drift vector pattern of magnetospheric convection, and

contours of calculated neutral temperature and neutral wind vectors over the Southern and Northern hemispheres, are shown and discussed. (Auth. mod.)

K-37191

Rycroft, M.J., **Some aspects of geomagnetically conjugate phenomena,** *Annales geophysicae,* Dec. 1987 5(6), p.463-478, Refs. p.476-477.

Both charged particles and waves convey information about the thermosphere, ionosphere and magnetosphere from the Northern to the Southern Hemisphere and *vice versa,* along geomagnetic flux tubes. The interhemispheric travel time of electrons or ions, being dependent upon *L*-value, pitch angle and energy, may be many hours, ranging down to 1 s. Such times give the time scales of transient phenomena that are geomagnetically conjugate and of changes in steady-state plasma processes occurring in geomagnetically conjugate regions. Contrasting examples are presented of conjugate physical phenomena, obtained using satellite, rocket, aircraft and ground-based observations; the latter capitalize upon the rather rare disposition of land—rather than ocean—at each end of a geophysically interesting flux tube. Particular attention is paid to the interactions between whistler mode waves and energetic electrons. (Auth. mod.)

K-37192

Lanzerotti, L.J., **Studies of a cusp-region hydromagnetic wave event with magnetometers and incoherent scatter radar,** *Annales geophysicae,* Dec. 1987 5(6), p.479-484, Refs. p.483-484.

A large-amplitude (about 100 nT) low frequency (about 0.002 Hz) hydromagnetic wave event was measured with magnetometers at three sites in conjugate areas near the magnetospheric cusp regions and with an incoherent scatter radar (ISR) at one site (Sondre Stromfjord). The magnetic signatures of the event showed good conjugacy between South Pole and Frobisher Bay (near-conjugate stations). A linear polarization was observed at the stations at the time of occurrence of the maximum amplitude of the event. The measured magnetic field variation amplitudes in the north-south direction were well-predicted by calculations based upon the ISR determinations of the ionospheric electric fields; the observed magnetic variations in the east-west direction were not well predicted. The ISR results give a good measure of the ionospheric ion heating produced by such a large-amplitude hydromagnetic wave event. (Auth.)

K-37193

Bering, E.A., III, Benbrook, J.R., **Conjugate ionospheric electric field measurements,** *Annales geophysicae,* Dec. 1987 5(6), p.485-502, Refs. p.502.

Eight campaigns that attempted conjugate electric field measurements are discussed: from Kauai, Hawaii in 1971 and 1972, on the Siple Station-Roberval field line in 1969-1970, 1975, 1978 and 1980-1981, a two-latitude campaign involving Siple-Roberval and Byrd-Great Whale River in 1971, and at South Pole in 1985-1986. In these campaigns there were twelve experiments that made reasonably conjugate observations. These data indicate that electric fields at conjugate locations were not well correlated about half of the time. Interpretations of these events suggest that there was one case where the observations were on open field lines, two cases where uncorrelated atmospheric dynamo fields seemed to be present, two cases where magnetospheric Birkeland currents were probably present, and three cases where the interpretation is uncertain. (Auth. mod.)

K-37197

Gledhill, J.A., **Twenty-five years of antarctic upper atmospheric research at Rhodes University,** *South African journal of science,* Mar. 1987 83(3), p.147-152, 20 refs.

Highlights of the South African experience in upper atmospheric physics are reviewed. Five years after the IGY, the first ionosonde was set up at SANAE and by 1963 the ionization measurement program was well established. In the 1960s new instrumentation replaced older equipment and oblique incidence ionograms were incorporated into the program. Particle precipitation observations were also emphasized and the SANAE bulletins of ionospheric characteristics provided wide circulation of the observed data. In the 1970s and early 1980s airglow observations enhanced the program and in 1983 the ISAAC (International South Atlantic Anomaly Campaign) program achieved notable success in measuring various kinds of E region ionization.

K-37239

Gulinskiĭ, O.V., Libin, I.IA., Prilutskiĭ, R.E., **Fluctuations of cosmic rays during periods of disturbances,** *Geomagnetism and aeronomy,* 1986 (Pub. Feb. 1987) 26(4), p.445-449, Translated from Geomagnetizm i aeronomiia. 12 refs.

Problems in the determination of the characteristics of random and regular magnetic fields according to fluctuations of cosmic-ray intensity (CRI) are examined. The processing of ground data on CRI is considered in connection with the essential nonstationary character of the random processes recorded, and methods for the identification and separation of spectral peaks are discussed. Utrecht and Kerguelen data for Sep. 7-24, 1977, are used to test the proposed algorithms. (Auth. mod.)

K-37240

Imhof, W.L., Voss, H.D., Datlowe, D.W., Mobila, J., **Isolated electron precipitation regions at high latitudes,** *Journal of geophysical research,* Apr. 1, 1988 93(A4), p.2649-2660, 17 refs.

An investigation has been made at high latitudes of regions or patches of isolated electron precipitation with data acquired by payload systems on the S81-1 satellite. Newer studies show that when some patch regions are processed with greater sensitivity, nearby weaker patches are found. This characteristic suggests that some of them may be parts of larger structures. There is considerable overlap in spectral shape between patches and larger structures, but the energy spectra of the X rays emitted from the patches are softer even at similar invariant latitudes. The majority of patches are not associated with auroral substorms and therefore appear not be related to westward traveling surges. At least some of the small precipitation patches reported here seem to be parts of larger structures which may encompass a variety of forms, including those that are arc-shaped in nature. (Auth. mod.)

K-37276

Jakobs, H.J., Hass, H., **Normal modes as simulated in a three-dimensional circulation model of the middle atmosphere including regional gravity wave activity,** *Annales geophysicae,* June 1987 5(3), p.103-114, 35 refs.

Investigations of gravity wave effects are made in a 3-D circulation model atmosphere extending from 10 to 150 km altitude. The main effect of regional gravity wave sources is the *in situ* generation of large-scale perturbations in the mesopause region. A space-time spectral analysis together with a bandpass filtering method show that most of the longer period disturbances approximately exhibit normal mode characteristics. The long period spectral range identifies westward traveling waves with periods of 30 h, 40 h, 2 d, 4 d and 8 d and an eastward traveling equatorial Kelvin wave with a period of nearly 3 d. The horizontal and vertical structure of the former simulated disturbances in the model are in close agreement with observations and theory of atmospheric normal modes, while the latter corresponds to the equatorial mesospheric Kelvin wave. (Auth.)

K-37277
Thuillier, G., Christophe, J., Dousset, C., Fehrenbach, M., **Auroral occurrence from 1963 to 1970 as observed at Dumont d'Urville Station,** *Annales geophysicae,* June 1986 4(3), p.247-257, Refs. p.256-257.

An all sky camera is used at Dumont d'Urville Station since 1957. A new data processing, based on the determination of the aurora intensity has been performed. The auroral occurrence is studied in three zones: North, Zenith and South of the station. Several properties of the auroral occurrence are derived: diurnal variation depending upon the season; relation with magnetic activity; occurrence of auroras of different brightnesses; long term and seasonal variations. All results show that the station exhibits mixed features of auroral zone and polar cap types depending upon UT and local magnetic activity. Auroral iso-occurrence lines are derived as a function of magnetic activity and season. The equinox auroral oval appears equatorwards shifted with respect to the winter one. Auroral occurrence and electron precipitation patterns are compared. Low energy electrons (some keV) seem the most responsible of the observed features. (Auth.)

K-37278
Hurren, P.J., Smith, A.J., Carpenter, D.L., Inan, U.S., **Burst precipitation induced perturbations on multiple VLF propagation paths in Antarctica,** *Annales geophysicae,* Aug. 1986 4(4), p.311-318, 26 refs.

The burst precipitation of energetic ($E>40$ keV) electrons near $L=4$ has been detected as amplitude perturbations (Trimpi events) on subionospheric 3.79 kHz CW signals from the Siple ($L=4.2$) VLF transmitter that were observed at Halley ($L=4.3$), Palmer ($L=2.3$) and South Pole ($Lambda=74$ deg) stations. The observations were made on the dayside of the Earth but beneath a locally dark ionosphere, during a generally disturbed 6 d period in July 1982 when the plasmapause projection was equatorward of the Halley and Siple-South Pole paths. Events detected at Halley showed similarities to Trimpi events previously reported on paths beneath the plasmasphere, but were of larger amplitude (1-8 dB, compared to typically 0.5-2 dB at lower latitudes), were time correlated with a wide variety of VLF noise forms in addition to whistlers, and were more variable in form and duration (up to 10-20 s). A minority of the events were observed simultaneously on two paths, and these tended to be associated with whistlers. (Auth.)

K-37279
Menvielle, M., Mareschal, M., **Anticorrelation between strengths of internal and transient external magnetic fields?,** *Annales geophysicae,* Aug. 1986 4(4), p.327-331, 12 refs.

A statistical study of auroral activity based on K indices recorded over 20 years (1959-1978) indicates the existence of some anticorrelation between local strength of the main field (given by the appropriate International Geomagnetic Reference Field) and amplitude of the external variation at the same site. The anticorrelation might also exist at low latitudes between internal and external fields not directly related to particle precipitation. (Auth.)

K-37284
Carpenter, D.L., Bell, T.F., Smith, A.J., **Siple VLF transmitter as a multi-frequency probe of the Earth-ionosphere waveguide,** *Journal of atmospheric and terrestrial physics,* Feb. 1988 50(2), p.105-115, 29 refs.

1983 receptions of subionospheric signals radiated from Siple to neighboring stations Palmer, and South Pole, each about 1500 km from the horizontal (magnetically east-west) VLF transmitting antenna at Siple, were strongly dependent upon azimuth and upon signal frequency. At Palmer signals near 2.5 kHz were often well defined, while the third harmonic of the transmitted signal, near 7.5 kHz, was not detected. Meanwhile, at Halley, the third harmonic was regularly observed and directionally stable, while the fundamental was often weak or undetectable. The field strength of the third harmonic component at Halley exceeded by about 40 dB the level of the fundamental, when both were normalized to the same antenna input power. The observed effects represent a way of extending the effective frequency range of the narrowband Siple antenna system, and also, by using the new crossed dipole configuration at Siple, of selectively probing certain regions of the Earth-ionosphere waveguide. (Auth. mod.)

K-37429
NIPR Symposium on Upper Atmosphere Physics, **Proceedings,** Tokyo, National Institute of Polar Research, 1988, 214p., For individual papers see I-37438 through I-37441, K-37430 through K-37437 and K-37442 through 37448.

This collection contains 25 papers from the Tenth Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, held at the Institute in Tokyo in Jan. 1987. The papers constitute about 41% of those presented and cover the main sections of the program. In spite of the Symposium title, several of the papers deal with upper atmospheric phenomena in equatorial and other low latitude regions.

K-37430
Tohyama, F., **Measurement of auroral magnetic field with the antarctic sounding rocket S-310JA-12,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.1-4.

A rocket containing a triaxial fluxgate magnetometer was launched from Showa Station at 1935 UT on July 12, 1985. Magnetic anomalous field was measured with high sampling time of every 10 ms. The vector magnetometer indicated an existence of field-aligned currents in the vicinity of an auroral arc and electrojet currents at the ionospheric level. (Auth.)

K-37431
Takahashi, T., **Attitude determination of the antarctic sounding rockets S-310JA-11 and -12,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.5-8.

The attitude of two sounding rockets, S-310JA-11 and -12 launched at Showa Station on May 29 and July 12, 1985, was determined using magnetometers and horizon aspect sensors. The spin rate of the S-310JA-11 rocket was 0.57 rps and the coning half angle of the precession was 8.8 deg with the period of 308 s. The spin rate of the S-310JA-12 rocket was 0.59 rps and the coning half angle of the precession was 25.0 deg with the period of 292 s. (Auth.)

K-37432
Takahashi, T., **Observation of electron density in the auroral ionosphere—results of the antarctic rockets S-310JA-11 and -12,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.9-15, 4 refs.

During the 26th JARE measurements of electron density were carried out as a part of the coordinated rocket experiments (S-310JA-11 and -12) for wave-particle interactions in the auroral ionosphere. The two rockets were launched into the auroral arcs of different type on May 29, 1985 and July 12, 1985, at Showa Station. The electron density profiles show characteristic signatures corresponding to the auroral forms and activities. Especially low altitude ionospheric layer of high electron density was observed in a bright arc of the break up type aurora by S-310JA-12 during its ascent. (Auth.)

K-37433
Mori, H., **Comparative analysis of electron density and electric field fluctuations in highly active auroras observed by a sounding rocket S-310JA-12: preliminary results,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.16-24, 6 refs.

The S-310JA-12 rocket was launched geomagnetically northward from Showa Station during a strong substorm period. The onboard instruments were a Faraday cup for measuring electron density and its fluctuations up to 8 kHz together with total flux of electrons with energies above 105 eV, and a pair of double probes for measuring DC electric field and electric field fluctuations of 5-220 Hz, which detected various kinds of ELF-VLF band fluctuations during the flight. During the ascent, the Faraday cup observed strong VLF fluctuations in the *E* region and burst-like fluctuations over the region from 140 to 200 km in altitude. Around the height of 220 km, quasi-sinusoidal waves with the frequency of about 150 Hz were observed by both instruments. During the descent, the rocket passed through highly active auroras and both instruments observed strong ELF fluctuations. The Faraday cup measurement suggests that the rocket was considerably charged up by the precipitating electrons in the auroras. (Auth.)

K-37434
Nagano, I., **Height variations of auroral hiss observed by S-310JA-11 and -12 rockets,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.25-36, 16 refs.

Electromagnetic waves constructing auroral hiss in the VLF range were observed by the S-310JA-11 and -12 rockets launched into a quiet auroral arc and into a breakup aurora respectively, from Showa Station. An altitude profile of the electric field intensity, which peaked at an altitude of 90 km, was observed by the S-310JA-12 rocket in the frequency range less than 5 kHz. An estimation of the source location of the auroral hiss was made with the altitude profile of the hiss intensity calculated by the full wave analysis so as to agree with those observed especially around the altitude of 90 km. It was found that the auroral hiss is most likely to be generated at an altitude about 700 km or less. On the other hand, the absolute intensity of the auroral hiss at a frequency of 4 kHz observed by the rocket was stronger by about 50 dB than that observed at Showa Station. This means that the *k*-vector direction of the auroral hiss actually observed by the rocket lay outside the transmission cone, so that the auroral hiss reached Showa Station at a very weak intensity. (Auth.)

K-37435
Sagawa, E., **Rocket observations of modulations of the low energy electron flux in the auroral ionosphere,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.37-45, 11 refs.

An instrument has been developed for observing the high frequency modulations or fluctuations of the auroral electron flux. The instrument utilizes on-board processing hardware for calculating autocorrelation functions of particle flux measured by any type of particle detector which emits a series of pulses. Two rocket observations using the instrument were carried out as a part of low energy auroral electron experiments on board the S-310JA-11 and -12 rockets which were launched into the antarctic auroral ionosphere. The instrument is capable of measuring the flux modulations in 3 frequency ranges, i.e. 1.5-100 Hz, 0.1-8 kHz and 0.1-4 MHz, respectively. Results from one rocket experiment launched under relatively quiet conditions indicate that the auroral electrons are almost uniform in the high frequency range. Results from another rocket experiment (JA-12) conducted under highly active aurora conditions show low frequency modulations of electron flux associated with a strong electron precipitation. (Auth.)

K-37436
Suzuki, H., **Auroral X-ray images observed by B15-3 balloon over Syowa Station, Antarctica,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.46-55, 11 refs.

A balloon observation of auroral X-rays was carried out over Showa Station in Dec. 1985 using a set of 3 inclined NaI(T1) scintillation counters. The energy-dependent structures of X-rays with energies greater than 22 keV were measured. In a case study of the X-ray event which occurred at 0145 UT on Dec. 14, an X-ray source region moved toward lower latitudes with a velocity of about 1 km/s. This experimental result was confirmed by a simulation calculation for auroral X-ray sources. The spatial distributions of auroral X-rays were consistent with the north-south dependence of 30 MHz cosmic noise absorption observed by a scanning-beam riometer at Showa Station. (Auth.)

K-37437
Kodama, M., **Auroral X-ray image formings using three directional NaI (T1) telescopes at balloon altitude,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.56-64, 10 refs.

This report presents the spatial distributions of auroral X-rays obtained by the balloon flight named AZCO-C1, which was launched from Norway in July 1985. A time sequence of auroral X-ray images was derived by using a set of 3 NaI (T1) scintillation counters for each of the 3 different energy channels: 22-35, 35-55 and 55-88 keV. The precipitation region of energetic particles and its modulations with time were well demonstrated, though the X-ray enhancements were only 3 times the background flux. The flight path of the balloon was such that it drifted over Iceland, a conjugate point of Showa. Unfortunately, when the balloon was over Iceland, clouds were over Showa so that the all-sky was not able to photograph the events. (Auth. mod.)

K-37442
Maeda, S., Fuller-Rowell, T.J., Evans, D.S., **Thermospheric structure associated with discrete levels of auroral activity,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.99-109, 13 refs.

A time-dependent calculation has been done to study dynamical and compositional structure of the thermosphere associated with discrete levels of auroral activity. The auroral activity level is given in terms of estimates of hemispheric power input due to particle precipitations. Heat and momentum input originated from the magnetosphere is estimated by using an empirical model constructed from the two data bases of the precipitating particles monitored by the TIROS/NOAA satellites and the ionospheric convection electric field measured by the Millstone Hill Incoherent Scatter Radar. The main results are discussed. The latitudinal grid for the model extends between the two geographic poles in 5 degree increments. (Auth. mod.)

K-37443
Sakurai, T., Tonegawa, Y., Sato, N., **Oscillation characteristics of Pi2 in auroral zone: Syowa-Iceland conjugate study,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.110-120, 11 refs.

Oscillation characteristics of Pi2 magnetic pulsations observed in auroral region have been statistically examined on the basis of the magnetic field data obtained at the conjugate stations, Showa Station and Husafell, Isafjördur and Tjörnes in Iceland. The examination reveals that the characteristics are quite different between the *H* and *D* components of Pi2 magnetic pulsations. The pulsations in *H* component show larger amplitude than in the *D* component. The orientation of the principal axis, ellipticity and phase relations of Pi2 oscillations are also statistically investigated. The important characteristics of Pi2 as hydromagnetic waves (HM waves) generated in the magnetosphere are believed to be exhibited well in the *H* component. All of the characteristics show that oscillations of Pi2 in auroral region are found to be resonant oscillations of magnetic field-line. Regarding the conjugacy of Pi2 oscillations, Showa and Husafell is also found to be the best conjugate station-pair in comparison with other station-pairs of Showa-Isafjördur, and Showa-Tjörnes. (Auth.)

K-37444

Ondoh, T., **Occurrence map of broad-band auroral VLF hiss observed by ISIS satellites,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.153-167, 20 refs.

A polar map of occurrence rate of broad-band auroral VLF hiss is drawn by using narrow-band VLF intensity data of 6 frequencies which were processed from ISIS electric field (50 Hz-30 kHz) tapes of 347 passes received at Showa Station from June 1976 to Jan. 1983. The high-latitude contour of occurrence rate of 0.3 lies at 74 deg around 10 h geomagnetic local time (MLT) and it extends down to 67 deg around 22 h MLT, showing a symmetricity with respect to the 10-22 h MLT meridian. Two regions of high occurrence rate above 0.5 lie between 76 and 78 deg in the afternoon sector and also between 78 and 81 deg in the late night-morning sector. The result is not consistent with the occurrence map of auroral hiss at 9.6 kHz with a pronounced dawn-dusk asymmetry obtained from Ariel magnetic field data by earlier investigators. This discrepancy between the ISIS and Ariel results is discussed from viewpoints of auroral particle precipitation and difference in VLF data used. (Auth.)

K-37445

Aikyo, K., Ondoh, T., Ohtaka, K., **Some characteristics and propagation of whistler-mode LF/MF emissions as observed at low altitudes above the antarctic region with ISIS-1,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.173-184, 19 refs.

Whistler-mode (w-mode) emissions in LF/MF bands observed at low altitudes in the nighttime auroral zone are examined in detail, especially from the viewpoint of the spectral characteristics and directions of wave vectors of the emissions using the ISIS-1 data including the fixed and swept frequency ionograms and AGC voltage traces of the sounder receiver. The emissions are characterized by spectra with relatively sharp upper cutoff ranging 0.75 to 0.4 electron gyrofrequency and with lower frequency cutoff less than 0.1 MHz for many cases. The directions of wave vectors at the satellite are determined from the antenna orientation at the instant when the emissions exhibit intensity minima on AGC voltage traces in the fixed frequency mode. The resultant directions of wave vectors are used as initial conditions for ray tracing to locate the source regions and to know the directions of wave vectors at the source region. It is shown that the cyclotron maser instability driven by auroral electron with upward loss cone at low altitudes is the most probable source mechanism which explains some characteristics of the observed emissions, particularly of their high frequency portion. (Auth.)

K-37446

Ogawa, T., Igarashi, K., Aikyo, K., Maeno, H., **Satellite observation of medium-scale traveling ionospheric disturbances over Syowa Station,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.192-198, 8 refs.

From Mar. 9, 1985 to Jan. 11, 1986, 428 medium-scale traveling ionospheric disturbances (TID's) were detected at Showa Station by means of differential-Doppler measurements with the 150 and 400 MHz beacon waves from 6 NNSS satellites. Statistical analysis shows that (1) the medium-scale TID's in the polar regions appear quite often during geomagnetically quiet and moderately disturbed conditions and their occurrence seems not to increase with increasing geomagnetic activity, (2) they attain the maximum activity in winter and the minimum in summer, (3) diurnal variation shows the maximum occurrence around 1400-1600 LT with a second maximum around midnight, and (4) most of the medium-scale TID's propagate from south toward the equator. These findings are compared with observations made at midlatitude to find a fairly good consistency between both results. It is pointed out that the gravity waves excited in the mesosphere rather than in the auroral ionosphere play an important role in producing most of the observed medium-scale TID's. (Auth.)

K-37447

Igarashi, K., Ogawa, T., Maeno, H., Kuratani, Y., **Ionospheric disturbance effect on NNSS satellite positionings at Syowa Station,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.199-203, 4 refs.

An experiment for investigating a relation between geomagnetic disturbance and satellite positioning error in the polar region was carried out at Showa Station in 1985 and 1986 with a two-wave (150 and 400 MHz) NNSS receiver. From the analysis of positioning data of about 10,000 passes over 245 days, it is clearly found that the position determination error increases with increasing geomagnetic disturbance level (local K-index) and the number of passes on which the position determination is successful decreases by one or two per day when K-index is large. These results suggest that when the ionosphere is highly disturbed the 150 and 400 MHz radio waves from the satellites are strongly scattered by ionospheric irregularities and/or spatial gradients of the electron density associated with ionospheric disturbances. (Auth.)

K-37448

Nozaki, K., Kikuchi, T., **Preliminary results of the multimode FM/CW ionosonde experiment,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1988, p.204-209, 8 refs.

Bottomside ionospheric observation was made with a microcomputer-controlled FM/CW ionosonde at Showa Station. This ionosonde provides ionograms for the transmitter frequencies from 2 to 16 MHz and also sequential data of virtual height (h') at a fixed frequency with a time resolution of 10 s. Since the peak power of the FM/CW ionosonde is 20 W, continuous observation was possible without disturbing other radio observations and HF radio communications. The continuous observation at a fixed frequency 2.6 MHz shows periodic variations in the virtual height and echo intensity with periods of one to several tens of minutes. Periodic variations with a period of several tens of minutes may indicate a propagation of excitation of internal gravity waves during a geomagnetically quiet period, while a variation with a period of 1 min could be caused by an oscillatory precipitation of energetic auroral particles. (Auth.)

K-37473
Stewart, R.D., Rodger, A.S., Dudeney, J.R., **Thermospheric wind response to driving forces in the vicinity of the Harang discontinuity,** *Planetary and space science,* Feb. 1988 36(2), p.225-229, 15 refs.

Fabry-Perot interferometer Doppler measurements of the 6300 Å oxygen emission line have been used to determine the neutral thermospheric wind over Halley Station. Simultaneous measurements of the local magnetic field have been used to generate a time frame with respect to the passage of the Harang discontinuity across the observing station. This identifies the night-time divergence in the dawn and dusk ion convection cells. Neutral wind measurements in this "Harang" time frame have shown a significantly higher degree of ordering than when considered in universal time. In particular, a reduction in the meridional component of the neutral wind is observed near the time of the discontinuity. This may be explained by a local reduction in Joule heating or through coupling to divergent convecting ions at the Harang discontinuity. The zonal component wind data show a marked transition from eastward to westward near 23:00 U.T., but there are no effects attributable to the Harang discontinuity. This transition arises because Halley moves from a regime where solar e.u.v. driven winds dominate to one where ion-drag is the most important driving force. This is supported by the dependence of the transition time on the level of local geomagnetic activity. (Auth.)

K-37474
Cravens, T.E., Killeen, T.L., **Longitudinally asymmetric transport of nitric oxide in the *E*-region,** *Planetary and space science,* Jan. 1988 36(1), p.11-19, Refs. p.18-19.

Rocket and satellite studies have demonstrated that nitric oxide (NO) in the thermosphere is almost always more abundant at higher than at lower latitudes. The ultraviolet NO spectrometer (UVNO) on the *Atmosphere Explorer C* spacecraft observed longitudinal asymmetries in thermospheric NO with greater abundances existing in the longitudinal sector associated with the magnetic poles of both hemispheres. This asymmetry persists even in geomagnetic coordinates. In this paper, an explanation is suggested for the longitudinal asymmetry, using neutral parcel trajectories calculated from the NCAR thermospheric general circulation model. It is evident from a study of these calculated trajectories that certain longitudes are favored for equatorward transport out of the auroral zone in the *E*-region. These favored longitudes are those associated with the magnetic poles, where NO is most abundant. (Auth.)

K-37512
Troshichev, O.A., Gusev, M.G., Nikolashkin, S.V., Samsonov, V.P., **Features of the polar cap aurorae in the southern polar region,** *Planetary and space science,* May 1988 36(5), p.429-439, 33 refs.

Data of the all-sky camera and photometer at Vostok Station in the antarctic nearpole region have been used for analysis of the auroral features in the southern polar cap. It is shown that the sun-aligned arcs appear in the polar cap with a delay time of about an hour relative to the northward turning of the IMF and that they can remain for many hours provided the IMF is invariable. The distribution of these aurorae in the dayside polar cap displays a *theta*-shaped pattern which is clearly separated from the latitude-oriented arcs in the auroral oval. Disappearance of the sun-aligned arcs after the southward turning of the IMF occurs in 10-15 min. The observation of the polar cap arcs immersed in a wide band of diffuse luminescence implies that the sun-aligned arcs should be located within the *theta*-aurora transpolar band. It is concluded that the distribution of the aurorae in the polar cap, auroral oval and in the day-side cusp requires a closed structure for the magnetosphere. The convection pattern corresponding to a closed magnetosphere suggests the formation of closed cavities with a stagnation plasma regime in the distant tail of the magnetosphere. (Auth.)

K-37513
Troshichev, O.A., Voloshinov, N.N., **Effects of magnetic activity and interplanetary magnetic field on the position of radioaurorae in the southern polar region,** *Planetary and space science,* May 1988 36(5), p.441-448, 16 refs.

The results of a statistical analysis based on the data of the Davis Base radar experiment for the period June-December 1982 are given. It is shown that radio aurorae display the position of the cleft region. The location of the cleft is affected by the IMF aspect angle component and not by the *AE* index: the cleft is displaced toward the equator when aspect angle turns toward the South. The probability of the daytime radioaurorae increases and the second maximum of radioaurorae appears in the morning hours when the Davis Station index grows. (Auth.)

See also:
A-36525 A-36550 E-37226 F-34971 G-34700 G-34712 G-36057 G-36064 G-37046 I-34725 I-34752 I-35630 I-36593 I-36643 I-36644 I-36760 I-37231

L. TERRESTRIAL PHYSICS

L-34681
Shemenda, A.I., Khrianina, L.P., **Model of stresses in the Antarctic lithosphere induced by ice loads** [Model' napriazheniĭ v litosfere Antarktiki, voznikaiushchikh pod deĭstviem ledovoĭ nagruzki], Zhizn' Zemli. Zemlevedenie i prirodnye resursy (The living Earth. Agriculture and natural resources) edited by S.A. Ushakov, Moscow, Universitet, 1986, p.97-102, In Russian. 14 refs.

Radial troughs, located in the Antarctic marginal zone 250-300 km wide, are explained by the tensile stresses exerted by the antarctic ice sheet, and compared to similar ruptures developed in Greenland under similar conditions.

L-34701
South Magnetic Pole located at sea by Australian expedition, *Australian physicist,* Mar. 1986 23(2), p.37-38.

The magnetic pole was located for the first time at sea at 65 deg 18 min S, 140 deg 2 min E or 152 km NNW of Dumont d'Urville at midday Jan 6, 1986. Previous expeditions which located the magnetic pole are reviewed. These were in 1909, 1912, and 1952. 19th century geomagnetic expeditions are also recounted.

L-34738
Shibuya, K., **Aeromagnetic survey around Syowa Station, Antarctica, 3. Flights no.14-Y2 by JARE-21,** *Japanese Antarctic Research Expedition. JARE data reports,* Sep. 1986 No.119, p.1-86, 5 refs.

This third report summarizes the logs, observed total intensity data and short-period time variation of aeromagnetic readings during Flights No.14-Y2 by the 21st Japanese Antarctic Research Expedition (JARE-21). For detailed explanations of the main characteristics of the survey, arrangement of data, and total intensity observed see 14L-29928 and 15L-32994 (JARE data reports Nos. 89 (1984) and 109 (1985), respectively. (Auth. mod.)

L-34770
Segawa, J., Kaminuma, K., Fukuda, Y., **Processing of sea gravity data using online navigational information of icebreaker *Shirase*,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.13-18, 1 ref.

The NIPRORI-1 gravimeter of icebreaker *Shirase* was modified so that the ship's navigational data were used in real time. Examples of measurement using the modified system during the 27th JARE are given to show the performance. (Auth.)

L-34771
Segawa, J., Matsumoto, T., Kaminuma, K., **Comments on the map of free-air gravity anomaly of the antarctic region,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.19-22, 6 refs.

A free-air gravity anomaly map of the Antarctic region was published in 1984 as Special Map Series of National Institute of Polar Research, No.3. In this paper some comments are given as to data distributions for compiling the map and characteristics of the gravity anomalies shown in the map, so that the map may be properly referred to. (Auth.)

L-34773
Funaki, M., Wasilewski, P., **Preliminary studies of natural remanent magnetization of the rocks collected from Ongul Islands, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* 1986 Special issue No.43, Symposium on Antarctic Geosciences, 6th, 1985. Proceedings, p.37-47, 21 refs.

331 rock samples collected from East and West Ongul Islands were studied paleomagnetically. Pyroxene gneiss and the majority of the garnet gneisses have unstable natural remanent magnetization (NRM), whose directions are similar to the present geomagnetic field in the Showa Station area. These unstable NRMs can be related to the existence of pyrrhotite. Hornblende gneiss, the other garnet gneisses, granite, amphibolite, siliceous rocks and pegmatite dykes have stable NRM. Magnetic carriers in stable rocks are considered to be iron oxide minerals (magnetite and hematite). The formations over a wide area of the Lützow-Holm Bay region were magnetized at the final stage of metamorphism about 480 Ma ago in a reversed geomagnetic field direction, then granite intrusions occurred during a period of normal geomagnetic field conditions. The time interval of this sequence may not be very long from the consideration of virtual geomagnetic pole (VGP) positions. Our result of VGP positions 20.2 S, 20.7 E supports previous paleomagnetic results obtained from the Lützow-Holm Bay region and from East Antarctica for early Paleozoic time. VGP positions are located in low latitudes near the present-day Africa. (Auth.)

L-34804
Elston, D.P., Bressler, S.L., **Paleomagnetic stratigraphy,** *New Zealand. Department of Scientific and Industrial Research. Bulletin,* 1986 No.237, Antarctic Cenozoic history from the MSSTS-1 drillhole, McMurdo Sound, edited by P.J. Barrett, p.109-114, 6 refs.

The remanent magnetization of much of the section recovered in core hole MSSTS-1 drillhole is stable and appears to reflect the ambient field direction at the time of deposition. However, two intervals, 147-165 m and 186-200 m, contained secondary or unstable magnetizations. This, and six major intervals from which no core was recovered, seriously compromised development of a polarity zonation useful for direct correlations with parts of the polarity time scale. Nonetheless, a correlation with the polarity time scale for the late Oligocene has been proposed for the section below 116 m employing a diatom zonation. (Auth.)

L-34866
Ostrovskaia, M.Kh., Papitashvili, V.O., Papitashvili, N.E., Timofeev, G.A., **Geomagnetic data processing for the project "Geophysical range in the Antarctic"** [Sistema obrabotki geomagnitnykh dannykh po proektu "Geofizicheskiĭ poligon v Antarktide"], *Geomagnitnye issledovaniia,* 1982 No.30, p.54-59, In Russian with English summary. 5 refs.

DLC QC811.A5A2

The paper describes the experimental part of the project "Geophysical range in the Antarctic" and a system of data preparation and computer processing. (Auth.)

L-34877

Herrod, L.D.B., Garrett, S.W., **Geophysical fieldwork on the Ronne Ice Shelf, Antarctica,** *First break,* Jan. 1986 4(1), p.9-14, 6 refs.

Reconstructions of Gondwanaland, the concept of a single landmass uniting all southern continents, recognize the central position of Antarctica relative to the other land fragments. Complex geological structures in the apparent overlap of South America and the Antarctic Peninsula point out the critical nature of the Ronne Ice Shelf to the understanding of the development of West Antarctica. To learn more of the nature and geophysical characteristics of the Ronne Ice Shelf, surveys are made to measure ice thickness, gravity, geomagnetism, seismicity, geodesy, and other physical parameters. These measurements and the logistics necessary to support field survey parties, both airborne and over ice traverses, are described and discussed.

L-34949

Courtney, R.C., Recq, M., **Anomalous heat flow near the Crozet Plateau and mantle convection,** *Earth and planetary science letters,* Sep. 1986 79(3/4), p.373-384, 39 refs.

A heat flow study has been performed near the Crozet Plateau (southern Indian Ocean), where the geoid and bathymetry are anomalously high with respect to the nearby deep ocean basins. Data collected on a 67 Ma old oceanic crust agree with simple plate model predictions at the stations furthest removed from the plateau. Heat flow values increase significantly towards the center of the feature, suggesting a thermal origin for this uplift. The ratio of geoid to bathymetry confirms that simple crustal thickening with Airy local compenstion cannot explain the observations. The data are compatible with a model of dynamic convective support of the plateau by an underlying thermal plume in the earth's mantle. (Auth.)

L-35035

Adams, R.D., Akoto, A.M., **Earthquakes in continental Antarctica,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.263-270, 4 refs.

No earthquake had been definitely located in the interior of the antarctic continent before that in Queen Maud Land, which occurred on Nov. 4, 1982, and was found by the "search" procedure of the International Seismological Centre. A further earthquake of similar magnitude *(Mb* 4.4) has now been located about 200 km inland from the coast of Wilkes Land, near 69 S, 123 E. The second event occurred on Sep. 20, 1983, and was also found by the ISC search procedure, from readings at 4 antarctic seismograph stations, and six farther afield. Reflected phases suggest that the focus of this earthquake is in the upper few kilometers of rock beneath the ice cap. Two later earthquakes occurred on May 19, 1984 about 400 km west of the 1983 event. Magnitudes *(Mb)* of 5.0 and 4.6 were recorded, large enough to be located by the US National Earthquake Information Service. (Auth.)

L-35036

Ikami, A., Ito, K., **Crustal structure in the Mizuho Plateau, East Antarctica, by a two-dimensional ray approximation,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.271-283, 17 refs.

A seismic experiment along a 300 km line, with 3 shots and 27 observation stations, was successfully made in the northern Mizuho Plateau. From the analysis of travel times and the amplitude study of synthetic seismograms, the crustal structure of the northern Mizuho Plateau was determined. The depths of the Conrad and the Moho discontinuities were determined as 31 km and 42 km, respectively. The P-wave velocity and depth relation was determined as 6.0 km/s on the surface of the bedrock, 6.3 km/s at a depth of 2 km, 6.8 km/s at the Conrad and 7.9 km/s at the Moho. The velocity in the crust increases gradually. The crustal structure obtained is representative of East Antarctica. (Auth. mod.)

L-35037

Ito, K., Ikami, A., **Crustal structure of the Mizuho Plateau, East Antarctica, from geophysical data,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.285-296, 22 refs.

The crustal structure between Showa and Mizuho stations is modeled from the gravimetric data and radio echo soundings of bedrock elevations, so as to fit the P-wave velocity structure derived from the data of explosion seismic experiments. The structure is extended from Showa Station seaward, across Lützow-Holm Bay, and from Mizuho Station southeastward, inland, where only gravimetric data are available. Thus, a crustal section about 600 km long is obtained on a margin of East Antarctica. The depth of the Moho increases by about 7 km from Showa Station to the point Y200 (71 deg 46 S, 48 deg 56 E), about 500 km from the coast. A graben-like structure is obtained along the line across Lützow-Holm Bay. This suggests that both sides of the bay are bounded by faults. (Auth. mod.)

L-35038

Nagao, T., Kaminuma, K., **Long-term underground temperature measurements at Syowa Station, East Antarctica,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.297-308, 25 refs.

Underground temperature measurements in 2 shallow boreholes were carried out at Showa Station from Apr. 1981 to Jan. 1985. Two quartz thermometers were installed in the first borehole, at depths of 2 and 5 m, respectively, and 3 in a second, at depths of 1, 4 and 6.8 m, respectively. Mean underground temperatures in the first borehole were -8.181 and -8.843 C, at depths of 2 and 5 m, and in the second -8.242 and -8.220 C, at depths of 4 and 6.8 m. As the mean air temperature at Showa Station was -10.8 C, the underground temperature in the 2-6.8 m depth range is about 2 deg. higher than the air temperature. The thermal conductivity of the drilled cores and surrounding outcropping rocks are also measured by the transient method with temperature conditions at +23 C and -20 C. The thermal conductivities measured in various samples at -20 C are about 7% larger than those at +23 C. This tendency is consistent with the results of holocrystalline rock experiments. (Auth. mod.)

L-35039

Segawa, J., Matsumoto, T., Kaminuma, K., **Gravity anomaly in and around Antarctica and its tectonic implications,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.309-326, 9 refs.

Presented are self-consistent free-air gravity anomaly maps of the Antarctic region, from 45 S to the South Pole, from gravity data obtained by satellites and ground-truth data obtained by land gravimeters and ship-borne gravimeters. The Bouguer anomaly was also calculated, from which estimates of crustal and lithospheric structures were made. This has resulted in clarifying the relationships among sub-bottom structures between the mid-oceanic ridges surrounding the Antarctic plate and the Ross Sea. (Auth. mod.)

L-35041

Bormann, P., **Structure and development of the passive continental margin across the Princess Astrid Coast, East Antarctica,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.347-373, Refs. p.372-373.

On the basis of geological and geophysical data, a contribution is made to understanding the structure and evolution of the Earth's crust across the Princess Astrid Coast, especially in the area of the Schirmacher Ponds and the Wohlthat Massif. The crustal material is mostly composed of medium- to high-grade metamorphics which underwent three important tectogenic events (close of the Archaean,

within the Proterozoic and at the close of the Precambrian). The intrusive age of the Eliseev Anorthosite Massif was determined (2,400 Ma). The dominant structural features in the Schirmacher Ponds show a strike of some 40 to 60 deg and indicate a NNE-SSW oriented compressional stress regime. It is probably connected with the last major thermotectonic event some 400 to 600 Ma ago. The Phanerozoic history is controlled by the younger Gondwana break-up and N-S oriented tension. The continental crust as a whole is of relatively acid composition. This is also reflected in the negative regional magnetic anomaly. Probably, its origin is linked to late Precambrian thermotectonic activation. A typical feature is the crustal thinning to the north (from some 50 to 20 km) in connection with deep-reaching E-W crustal faults indicating northward down-faulted blocks. (Auth.)

L-35043

Shibuya, K., Kaminuma, K., **Aeromagnetic survey around Syowa Station, East Antarctica,** *Journal of geodynamics,* Dec. 1986 6(1-4), p.387-389, 6 refs. Extended abstract.

Survey flights were conducted over the Lützow-Holm Bay, Yamato Mountains, Shirase Glacier, Mizuho Plateau and several long-distance profiles to Enderby Land, in 1980-1984. The area is covered by comparatively dense survey profiles. The flight logs, data acquisition system, diurnal variation observed during the survey flights, and the total intensity data obtained are compiled and reported regularly in JARE Data Report, Earth Science Series. The regions concerned are covered by the auroral zone and short-period time variation of the geomagnetic field is sometimes so large as to change by 200-300 nT in 2-3 hrs. Survey Flights are usually planned during geomagnetically quiet times with Kp index less than 1. (Auth. mod.)

L-35051

Eittreim, S.L., Hampton, M.A., Smith, G.L., Childs, J.R., **Marine geophysical data from Wilkes Land continental margin, Antarctica,** *U.S. Geological Survey. Open-file report,* 1986 No.86-339, 9p., Refs. p.5-6.

In 1984, a geophysical survey of the continental margin of Wilkes Land was conducted by the U.S. Geological Survey aboard the R/V *S.P. Lee.* This survey yielded approximately 1,800 km of 24-fold multichannel seismic reflection data, 400 km of single channel seismic reflection data, and other geophysical profile data including gravity, magnetic gradiometer, 3.5 and 12 kHz high-resolution echo-sounding and sonobuoy refraction profiles. Gravity and echo-sounding data were collected along the transit lines from New Zealand prior to the survey, and to McMurdo Sound after the survey. (Auth.)

L-35154

Von Frese, R.R.B., Mateskon, S.R., **Modeling magnetic and gravity effects of the Transantarctic Mountains,** *Antarctic journal of the United States,* 1985 20(5), p.1-3, 2 refs.

A 3-year program, initiated on Apr. 1, 1985, which involves developing the capacity to model magnetic and gravity anomalies over a spherical earth for verifying and detailing geological analyses of the regional anomaly fields, is discussed. The procedure implemented for this purpose, and its modification, is described as being used to compute, in spherical coordinates, the regional geopotential anomaly fields of the Transantarctic Mountains to separate these effects from the anomalies of deeper lithospheric sources which are the focus of the investigation. Preliminary results include magnetic and gravity analyses for a portion of the mountain range. Gravity terrain corrections relative to the Bouguer slab reduction at each grid node of the topographic surface are given.

L-35170

Kaminuma, K., Shibuya, K., Niida, K., **Geophysical studies on Mount Erebus,** *Antarctic journal of the United States,* 1985 20(5), p.28-30, 9 refs.

Continuous seismic observations have been carried out since December 1980 showing that new volcanic activities of Mount Erebus commenced on Sep. 13, 1984. From 5 to 19 large explosions were clearly recorded at Scott Base each day from Sep. 13 to 24, increasing from Sep. 25 to 29 (12 to 31 per day). About 20 explosions per day on average occurred in Oct. and 15 per day in Nov. A new type of eruption which can be suitably called a gas-jetting eruption, commenced on Dec. 3, and the large eruptions began to cease at the same time. The seismic activity observed on and around Mount Erebus is summarized. To reveal the structure of the Erebus volcano, especially to confirm the existence of the magma reservoir, explosion seismic measurements were carried out in Dec. 1984. All 7 explosions, listed in a table, produced excellent records. Five new gravity stations, established on Ross I. during the 1984-1985 austral summer, obtained gravity values with higher accuracy than the data measured in the last season. To enhance the study of the structure of McMurdo volcanoes using both geophysical and geological methods, field studies were made on the volcanic rocks and the xenoliths during the 1984-1985 austral summer at Crozier, Hut Point Peninsula, and Black I. The purpose of the geological field work at these volcanic sites was to study and collect xenoliths.

L-35172

Cherry, E.M., Noltimier, H.C., **Paleomagnetism and hydrothermal alteration: Kirkpatrick Basalt Group, Victoria Land,** *Antarctic journal of the United States,* 1985 20(5), p.32, 12 refs.

Detailed alternating field (AF) and thermal demagnetization experiments were conducted on 11 Kirkpatrick Basalt Group (KBG) flows from the Mesa Range area, and on 5 KBG flows and one Ferrar Dolerite Group sill from Gorgon Peak. Results indicate that the natural remanent magnetization contains a significant component of chemical remanent magnetization (CRM). Hydrothermal alteration has resulted in the incomplete low temperature oxidation of titanomagnetite to titanomaghemite. Both of these phases have the spinel structure, and thus, have similar magnetic properties and exhibit a similar response to AF demagnetization. It is suggested that it is not likely that the presence of CRM in the Ferrar Supergroup rocks will significantly alter mean Jurassic virtual geomagnetic pole for the Transantarctic Mountains, because late state hydrothermal alteration will have the effect of averaging secular variation. However, this CRM component is strong enough to overprint primary reversals in the thermoremanent magnetization that are useful in intra- and inter-regional correlations.

L-35206

Matsumoto, T., Segawa, J., Kaminuma, K., **Distribution of Bouguer gravity anomaly and crust and upper mantle in the antarctic region,** *Antarctic record,* Nov. 1986 30(3), p.149-163, In Japanese with English summary and captions. 21 refs.

Bouguer anomaly in the Antarctic Continent presents negative anomaly, showing that the land area is in isostatic equilibrium with the thick crust supporting the load of both thick ice sheet and bedrock topography. In the surrounding ocean area there is a zone of relatively negative anomaly corresponding to the mid-oceanic ridges. The result of further analysis shows that there is some relationship between the sub-bottom structure of the Ross Sea and that of mid-oceanic ridges, and that no clear boundary of lithosphere and asthenosphere is recognized, which suggests that the asthenosphere reaches up to the bottom of the crust in this area. (Auth. mod.)

L-35207
Fukuda, Y., **Gravimetric connection between Asuka Camp and Syowa Station, with gravity survey on Rundvågshetta,** *Antarctic record,* Nov. 1986 30(3), p.164-174, In Japanese with English summary and captions. 3 refs.

Gravimetric connection between Asuka Camp and Showa Station was established during the summer activities of JARE-27. Gravity measurements were carried out by using two LaCoste-Romberg gravimeters models G-477 and -805 at Asuka Camp on December 27th and 28th, 1985, and also at Showa Station in early January, 1986. Although the gravimetric connection was achieved only one way, data analyses were carried out successfully using all other gravity measurements during JARE-27 to detect drift rates and other instrumental parameters. The gravity values at Asuka Camp were determined relative to the value at Showa Station with an accuracy of 0.2 mgals. Although it is not satisfactory compared with the recent precise gravity measurements, the accuracy is reasonable considering rather hard situations of the gravity measurements in Antarctica. Another gravity survey was carried out on Rundvågshetta in late January, 1986. Eight gravity stations, including five triangulation stations, one astro-geodetic station and other points, were newly established in the area. The results of the survey are reported briefly. (Auth.)

L-35232
Patriat, P., **Bathymetry and magnetism** [Bathymétrie et magnétisme], *Terres Australes et Antarctiques Françaises. Mission de Recherche. Rapports des campagnes à la mer,* Feb. 1987 No.84-01, p.325-345, In French.

Bathimetric, magnetic and navigational data, collected along the entire trajectory of the Apsara 2 and Antiprod 3 cruises in order to determine the evolution of the West Indian ridge in the Subantarctic, are discussed and tabulated.

L-35270
Pardo, M., Alvear, L., **O'Higgins (OHC) seismological station: data bulletin Dec. 1983-Nov. 1984** [Estación sismológica O'Higgins (OHC): Boletín de lecturas diciembre 1983-noviembre 1984], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1986 No.34, p.105-118, 1 ref., In Spanish.

The seismological station Bernardo O'Higgins is described as being of a conventional, electromagnetic type, with photographic recorders; it consists of 6 components, 3 short periods, and 3 long periods. Seismic data for Dec. 19, 1983-Nov. 1984 are presented and explained.

L-35338
Lawver, L.A., Bergh, H., Barker, P.F., **Evolution of the far South Atlantic during the Late Cretaceous,** *Antarctic journal of the United States,* 1985 20(5), p.88-90, 9 refs.

During the summer of 1983, a collaboration was begun with the goal of merging unpublished University of Birmingham marine geophysical data with similar data that had been collected along the American Antarctic Ridge and with all the pertinent National Geophysical Data Center profiles. With the addition of the British soundings, ridge segments and transform faults have been located, and offridge area contouring, correlation and identification of magnetic anomalies, and determination of direction and spread rate along the American Antarctic Ridge during the past 45 million years are possible. A triple junction model has been developed which shows that some of the magnetic anomalies, formed between 82 to 65 million years ago at the South American/Antarctic plate boundary, should now be found southeast of the Falkland Plateau.

L-35643
Murakami, M., Tajima, K., Funaki, M., **International gravimetric connections along the Circum-Pacific zone. 4. Drift characteristics of LaCoste & Romberg gravimeters (Model G),** *Geodetic Society of Japan. Journal,* 1983 29(3), p.141-149, In Japanese with English summary. 4 refs.

The drift of LaCoste & Romberg gravimeters (model G) was thoroughly examined, using data obtained by the international gravimetric connections which were carried out at selected cities, mainly along the Circum-Pacific zone and including McMurdo Sound, from 1979 to 1982. It was clearly recognized that positive and negative drifts of some gravimeters occurred when the gravimeter was brought from cities with large and small gravity values, respectively. Generally speaking, cities with large gravity values are cooler, while those with small values are warmer. Such a pronounced tendency to drift could be explained by an elastic property of the springs inside of the gravimeter. It is difficult to conclude, at present, which affects the drift of the gravimeter more: ambient temperature or gravity value of measuring stations. (Auth. mod.)

L-35703
Kaminuma, K., Shibuya, K., **Seismological bulletin of Syowa Station, Antarctica, 1985,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1987 No.124, 80p., 1 ref.

Reported are data obtained by the seismic observation system at Showa Station, and the outline of the system is schematically illustrated. The over-all frequency response and the magnification of the short-period and long-period seismographs are shown. Tables are presented of the read-out data, with date, phase, and the arrival time of the events; the A/D conversion of input voltage; and a list of 80 earthquakes, detected at Showa Station and shown on a map. In the appendix, examples of wave-form output of each event (10 blocks) to the graphic display are shown.

L-35706
Recq, M., Charvis, P., Hirn, A., **Preliminary results on the deep structure of the Kerguelen Ridge, from seismic refraction experiments** [Premières données sur la structure profonde de la ride de Kerguelen, d'après la réfraction sismique], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série 2,* Dec. 19, 1983 297(13), p.903-908, In French with English summary. 21 refs.

DLC QD1.A26

In Mar. 1983, seismic refraction profiles were carried out on the ground for the first time in the Kerguelen archipelago. Preliminary results from first arrival studies show that the thickness of the crust is only 15 km beneath the eastern area and increases toward the center of the archipelago. The seismic velocity vs. depth distribution is similar to those of oceanic aseismic ridges (i.e. Crozet and Madagascar Ridges). These preliminary data on the deep structure of the crust favor the hypothesis of an oceanic origin for the Kerguelen Is. and for the Kerguelen-Heard submarine Plateau. (Auth.)

L-35710
Simmons, D.A., **Measurement of declination at South Georgia, 1700-1984,** *Polar record,* Jan. 1987 23(145), p.419-426, 22 refs.

Declination, or the difference between true and magnetic north, is one of the earliest parameters to have been measured systematically over the earth's surface. Values are available for South Georgia and the surrounding area from 1700 to the present. Observations were made from ship by Edmond Halley in 1700, by James Cook in 1775 and thereafter more frequently. Land-based observations were made

during the First Polar Year in 1882-3, more recently by the British Antarctic Survey 1975-82. Declination has diminished from 23 E in 1700 to about 9 W in 1980, approximately 0.1 deg per annum. The modern observations suggest that the rate of change has slowed in recent years. (Auth.)

L-35742

Shibuya, K., Tanaka, A., Manabe, M., **Aeromagnetic surveys over the Yamato Mountains and Yamato Meteorite Ice Field, East Antarctica,** *Antarctic record,* Mar. 1987 31(1), p.1-11, 13 refs.

Aeromagnetic surveys were conducted in the Yamato Mountains and the Meteorite Ice Field region in 1975 and 1980, using Cessna A185F and Pilatus Porter PC-6 aircrafts respectively. Distribution of geomagnetic anomaly in this area obtained from those surveys is thought to be correlated mostly with the subglacial topography rather than type or magnetic susceptibility of bedrock. (Auth.)

L-35779

Rooney, S.T., Blankenship, D.D., Bentley, C.R., **Seismic refraction measurements of crustal structure in West Antarctica,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.1-7, 5 refs.

Two seismic refraction profiles yield new information about the crustal structure of West Antarctica. One profile on the Ross Ice Shelf grid northwest of Crary Ice Rise shows basement rock with a compressional wave velocity of 5.9 km/s underlying a layer of presumed sediment about 400 m thick. The irregular basement surface lies about 1.0 km below sea level and has an average apparent dip of 1 deg to the grid north. The second profile, on the Siple Coast, reveals 1 to 2 km of sediment overlying a basement that has an apparent dip of 4 deg to the grid southeast. An abrupt 2-km decrease in depth to basement within the profile is interpreted as being due to faulting. Deep reflections were observed on one record at 50 km, but data are insufficient for identification of their source. (Auth.)

L-35780

Von Frese, R.R.B., Hinze, W.J., Olivier, R., Bentley, C.R., **Satellite magnetic anomalies and continental reconstructions,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.9-15, 16 refs.

Regional magnetic anomalies observed by NASA's magnetic satellite mission over the eastern Pacific Ocean, North and South America, the Atlantic Ocean, Europe, Africa, India, Australia, and Antarctica are adjusted to a fixed elevation of 400 km and differentially reduced to the radial pole of intensity of 60,000 nT. Having been normalized for differential inclination, declination, and intensity effects of the core field, these radially polarized anomalies in principle directly map the geometric and magnetic property variations of sources within the lithosphere. When plotted on an Early Cambrian reconstruction of Gondwanaland, many of the radially polarized anomalies of the continents demonstrate detailed correlation across the continental boundaries to verify the prerift origin of their sources. Accordingly, these anomalies provide fundamental constraints on the geologic evolution of the continents and their reconstructions. (Auth. mod.)

L-35789

Garrett, S.W., Herrod, L.D.B., Mantripp, D.R., **Crustal structure of the area around Haag Nunataks, West Antarctica: new aeromagnetic and bedrock elevation data,** *American Geophysical Union. Geophysical monograph series,* 1987 No.40, Gondwana Six: structure, tectonics, and geophysics. Edited by G.D. McKenzie, p.109-115, 25 refs.

Five thousand line kilometers of new airborne geophysical data are presented from the area between the Antarctic Peninsula and Ellsworth Mountains. The southernmost end of the Antarctic Peninsula shows isolated aeromagnetic anomalies of over 400-nT amplitude which correspond to discrete plutonic bodies. The central area of Fowler Peninsula shows a continuous zone of high-amplitude (600 nT) short-wavelength (5 km) anomalies attributed to metamorphic rocks which outcrop beneath the ice cover. This interpretation is supported by measurements of the magnetic properties of Precambrian rocks exposed at Haag Nunataks. Anomalies of up to 400-nT amplitude and 50-km wavelength suggest a magnetic basement between 5 and 15 km below Evans Ice Stream, Carlson Inlet, Fletcher Promontory, and Rutford Ice Stream. A correlation of steep bedrock scarps, magnetic anomalies, and depth to magnetic sources indicates major faults delimiting horst and graben structures formed during northeast to southwest extension. (Auth. mod.)

L-35866

Marsz, A.A., **Tentative assessment of the rate of isostatic movement on the Admiralty Bay shores on King George Island of the South Shetland Islands, West Antarctica,** *Quaestiones geographicae,* 1983 (Pub. 1985) Vol.9, p.99-106, 8 refs.

DLC G1.Q3

The article attemps to assess the rate of isostatic movement that takes place on King George I., the largest of the South Shetland Is. Field studies were carried out in two sectors of the Admiralty Bay shores. The estimated rate of uplift ranges between about 11.5 mm a year (a minimum rate) and 21-22 mm a year (a maximum rate). The actual rate of the Admiralty Bay shore uplift seems to approach the upper value of the interval, i.e. about 21-22 mm annually and is identical for both bay shores. Analysis of the pattern of beach ridges indicates that the rate of isostatic uplift has become more rapid in the last several tens of years than before. (Auth.)

L-35915

McIntosh, W.C., Sutter, J.F., **Paleomagnetic results from the Kirkpatric Basalt Group, Mesa Range, north Victoria Land, Antarctica,** *American Geophysical Union. Antarctic research series,* 1986 Vol.46, Geological investigations in northern Victoria Land, edited by E. Stump, p.289-303, 30 refs.

Sixty samples from 15 Jurassic Kirkpatrick Basalt Group flows in the Mesa Range, north Victoria Land, were studied paleomagnetically using alternating field and thermal demagnetization. The magnetic mineralogy was examined using reflected light microscopy and thermomagnetic analysis. All of the samples show strong, stable, normal remanence interpreted as a primary thermoremanent magnetization carried by titanomagnetite; components of secondary remanence were minor. Small components of viscous magnetization were readily removed by AF demagnetization in fields of 20 mT. Samples from 14 flows are free from components of chemical remanent magnetization (CRM); samples from the fifteenth flow exhibit a minor CRM component in a reversed direction. The mean virtual geomagnetic pole of the Mesa Range samples lies significantly south of the mean paleomagnetic pole reported from Jurassic rocks elsewhere in Antarctica. (Auth. mod.)

L-36069

Blankenship, D.D., Anandakrishnan, S., Kempf, J.L., Bentley, C.R., **Microearthquakes under and alongside Ice Stream B, Antarctica, detected by a new passive seismic array,** *Annals of glaciology,* 1987 Vol.9, Symposium on Remote Sensing in Glaciology, 2nd, Cambridge, Sep. 8-9 and 11-12, 1986. Proceedings, p.30-34, 15 refs.

A new seismographic array with a band width of 500 Hz per channel and a dynamic range of 96 dB was developed for detecting natural events on glaciers. It was first deployed on ice stream B during the 1985-86 austral summer. The network consists of nine solar-powered seismographs, each monitoring three components of ground motion. Each of the seismographs is connected by up to 4 km of fiber-optic cable to a central node where seismic events are both detected and recorded. During 85 h of passive seismic monitoring on ice stream B, 25 microearthquakes were observed. Sixteen of these events were associated with shallow crevassing, mostly near the margins, although not within the zones of extreme shearing that bound the ice streams. Nine microearthquakes were associated with low-angle thrusting near the base of the ice stream. The principal initial result of these passive seismic studies is the demonstration that virtually none of the energy dissipated beneath ice stream B takes place through brittle fracture near the base. Nevertheless, fracture associated with microearthquakes may play a significant role in sub-glacial erosion. (Auth.)

L-36086

Eittreim, S.L., Smith, G.L., **Seismic sequences and their distribution on the Wilkes Land margin,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.15-43, 47 refs.

DLC QE350.A567 1987

Using multichannel seismic data collected in 1984 three unconformities are defined, the two deepest of which are associated with rifting and continental breakup. A breakup unconformity terminates at the oldest oceanic crust, and a deeper unconformity, erosionally truncates strata of the deepest of the four sedimentary sequences. The deepest sequence is well stratified and block faulted and is interpreted as prerift continental strata. A shallow-dipping reflector under the block faults may represent a décollement surface; it intersects the Moho near the oceanic crust boundary. A marginal rift basin, about 40 km wide, lies adjacent to the edge of oceanic crust and is interpreted as a remnant rift valley. The floor of the marginal rift basin is about 3 km deeper than the adjacent oceanic crust, and the basin is filled with steeply prograded clastic sediments. The extent of crustal thinning across the transition zone is calculated. Under the midcontinental rise the model infers thinning by a factor of 1.7 and in the region of the marginal rift basin, thinning is inferred to be a factor of 5 and greater. (Auth. mod.)

L-36089

Moore, G.W., Eittreim, S.L., **Mechanism of extension and rifting at the Antarctica continental margin,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.89-97, 32 refs.

DLC QE350.A567 1987

A strong subbottom reflection from the crust-mantle interface extends from below oceanic crust to under the continental crust of Antarctica for more than 80 km. Based on interpretations of seismic-reflection profiles, it is proposed that during lithospheric extension hot mantle material (foliated peridotite) rose as a dike-like body to the base of the continental crust. As the newly emplaced mantle material widened, the continental crust was thinned by low-angle detachment faults that transported slabs of crustal material from both opposed plates directly onto the new mantle. The dike of mantle material continued to widen and to intrude to progressively shallower depths, and when the intrusion reached a critical subsurface depth, the weight of the remaining thin cover of continental crust at the toes of the slides was small enough to permit partial melting of the mantle peridotite to form basaltic magma. Subsequently, a rift broke through to the surface, and basaltic oceanic crust began to form. The new oceanic crust then extended to accommodate plate separation, and while spreading continued in the middle of the belt of oceanic crust, an essentially unfaulted layer of sediment was laid down across the continent-ocean boundary. (Auth.)

L-36090

Childs, J.R., Stagg, H.M.J., **Deep crustal structure of the Wilkes Land continental margin,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.99-116, 33 refs.

DLC QE350.A567 1987

Marine refraction, gravity, and magnetic data from the Wilkes Land margin of Antarctica are used with multichannel seismic profiles to model the crustal structure over the continent-ocean boundary (COB) of this passive margin. The crustal types encountered in the study include normal oceanic crust, marginal rift-basin crust, and thinned continental crust. The latter two crustal types comprise the crustal transitional zone, which extends approximately 35 km landward of the COB and is characterized by heterogeneous velocity structure. Gravity models suggest that the transitional zone is underlain by a body that is slightly less dense (3.15 g/cu cm) than typical for mantle material. Inconsistencies between the sonobuoy data from the Wilkes Land margin and similar data from the corresponding conjugate margin of southern Australia are noted. (Auth.)

L-36091

König, M., **Geophysical data from the continental margin off Wilkes Land, Antarctica—implications for breakup and dispersal of Australia-Antarctica,** *Circum-Pacific Council for Energy and Mineral Resources. CPCEMR earth science series,* 1987 Vol.5A, p.117-145, 79 refs.

DLC QE350.A567 1987

A distinctive pattern of geophysical anomalies delimits and characterizes a magnetic quiet zone situated over the continental slope and rise. The data document that the quiet zone is fundamentally different from the ocean basin to the north and the continent to the south. The pattern of geophysical anomalies off Wilkes Land, Antarctica, shows a remarkable degree of similarity to the pattern of gravity, magnetics, and seismic data observed on the southern continental margin of Australia. This similarity is the basis for extending the interpretation of the Australian quiet zone as overlying the remnant of a fossil rift system to the conjugate quiet zone off Wilkes Land. The new reconstruction is less tight than those previously proposed, for it includes the 250 km wide rift zone as it existed just prior to continental breakup. The fit further avoids any overlap of continental material and fully satisfies the geologic constraints governing the reassembly of Australia and Antarctica. (Auth. mod.)

L-36159

Kalamarides, R.I., Berg, J.H., Hank, R.A., **Lateral isotopic discontinuity in the lower crust: an example from Antarctica,** *Science,* Sep. 4, 1987 237(4819), p.1192-1195, 23 refs.

The lower continental crust is one of the least known variables in the crust-mantle evolutionary equation. In order to study the nature and compositional heterogeneity of the lower crust, more than 20 inclusions of lower crustal granulites in volcanic rocks from the McMurdo Sound region of Antarctica were analyzed for strontium and oxygen isotopes. These inclusions were erupted from volcanic centers covering an area of 12,000 sq km. Along with results from analyses of major and trace elements, the isotopic data reveal a profound discontinuity in the composition and probably the age of the lower crust that coincides with the boundary between the Transan-

tarctic Mountains and the Ross Embayment. Although this topographic boundary between East and West Antarctica is largely a cenozoic development, which apparently reflects a simple subvertical faulting relationship due to crustal rifting, the isotopic differences in the lower crust across the boundary suggest that the current faulting and rifting may coincide with an older crustal suture, the age of which is uncertain. (Auth.)

L-36170

Davey, F.J., Cooper, A.K., **Gravity studies of the Victoria Land basin and Iselin Bank,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.119-137, 14 refs.

DLC QE350.A568 1987

New gravity and bathymetry maps are presented for the west and central Ross Sea. The gravity data show a large negative anomaly trending north-south along the axis of the Victoria Land basin. Gravity models demonstrate that this negative anomaly can be accounted for by increased water depth and thicker low density and velocity sediments along the basin axis, as noted on seismic data. The gravity models also indicate that thin crust lies under the basin. This thin crustal section thickens rapidly at the coast between McMurdo Sound and Cape Washington to about 40 km under the Transantarctic Mountains. The northern boundary of the Victoria Land basin near Cape Washington marks the northern boundary of the region of thin crust. This coincidence suggests that the thin crust formed as a result of extensional tectonics associated with the older, major episode of basin formation of the Victoria Land basin rather than with the younger extensional episode causing active rifting along the basin axis. Gravity models over Iselin Bank show a crustal thickness of 21-24 km. Several graben structures occur on top of the bank, trending parallel to the axis of the bank. A sedimentary trough and associated thinned crustal section indicate extensional tectonics has occurred off the western margin of the bank. (Auth.)

L-36171

Hansen, R.O., Childs, J.R., **Antarctic continental margin magnetic gradiometer data: suppression of time variations,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.139-153, 7 refs.

DLC QE350.A568 1987

Temporal magnetic variations have been successfully removed from marine magnetic gradiometer data recorded on both the Wilkes Land and Ross Sea segments of the U.S. Geological Survey 1984 antarctic continental margin survey. Gradiometer data reconstruction techniques have been applied to remove the short-period time variations (up to about 5 hours) from the data and thereby eliminate many false anomalies. Time variations removed from the marine magnetic data and those recorded in magnetograms at the Scott Base observatory show close agreement and confirm that the gradiometer reconstruction technique correctly recognizes short-period time variations. It is concluded that time-variation magnetic anomalies recorded in marine magnetic data can be accurately identified and separated from geologically derived anomalies using a gradiometer system. This technique is of particular importance in the Antarctic, where storm activity is severe, and base station data is of limited use in removing time-variation anomalies.

L-36172

Behrendt, J.C., Cooper, A.K., Yuan, A., **Interpretation of marine magnetic gradiometer and multichannel seismic-reflection observations over the western Ross Sea shelf, Antarctica,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.155-177, 33 refs.

DLC QE350.A568 1987

Marine magnetic gradiometer measurements allowed compilation of total magnetic-intensity profiles corrected for temporal magnetic variations. The western and eastern boundaries of the Victoria Land basin, as well as the central Lee arch in the active Terror rift zone, are characterized by short-wavelength (200-1400 nT) 1-5 km wide anomalies that are interpreted as volcanic in origin. Theoretical anomalies support the interpretation that submarine volcanoes and associated subvolcanic intrusions penetrate the sedimentary section. Magnetic and seismic data near Granite Harbour at the west side of the VLB suggest a submarine caldera with a volcanic dome and associated intrusion. This implies active or Holocene volcanism because of an inferred nonmagnetic core. The Terror rift has a 100 km wide negative regional anomaly of about 100-nT amplitude with a relative positive anomaly over the Lee arch on two profiles. Magnetic models suggest that basement relief beneath the thick sedimentary section in the graben and an upwarping of the Curie isotherm beneath the arch may both contribute to the source of the anomaly. The east side of Iselin Bank, at the continental shelf edge, is marked by an apparently linear step-like 200-nT magnetic anomaly, positive over oceanic crust. Magnetic models controlled by multichannel seismic-reflection and sonobuoy refraction data imply that this anomaly is caused by highly magnetic oceanic crust contrasted to more weakly magnetized continental crust of Iselin Bank. (Auth. mod.)

L-36173

Blackman, D.K., Von Herzen, R.P., Lawver, L.A., **Heat flow and tectonics in the western Ross Sea, Antarctica,** Earth science series, Vol.5B, The antarctic continental margin: geology and geophysics of the western Ross Sea. Edited by A.K. Cooper and F.J. Davey, Houston, TX, Circum-Pacific Council for Energy and Mineral Resources, p.179-189, 40 refs.

DLC QE350.A568 1987

The western Ross Sea is the site of various tectonic processes: subsidence of Ross Embayment; rapid uplift of the Transantarctic Mountains; and Cenozoic through Recent volcanism. Several plate tectonic reconstructions require relative motion between East and West Antarctica, perhaps by extension and rifting in the Ross Sea. These processes could account for regionally anomalous thermal conditions in the lower crust or upper mantle. Heat flow was measured at two locations in the western Ross Sea. The results, combined with previously published measurements in the Ross Embayment, indicate that there is greater than average heat flow in this area. Although the data coverage is sparse, it is apparent that somewhat anomalous thermal conditions exist in the area and may be related to the observed tectonic structure of the Ross Embayment. (Auth.)

L-36208

McGibbon, K.J., Garrett, S.W., **Magnetic anomalies over the Black Coast, Palmer Land,** *British Antarctic Survey. Bulletin,* Aug. 1987 No.76, p.7-20, 30 refs.

Regional aeromagnetic data gathered over eastern Palmer Land reveal a north-south aligned cluster of short-wavelength (10-20 km), large-amplitude (800-2000 nT) anomalies which may be modelled using shallow bodies of 10 km width and high magnetization (>5 A/m). A ground magnetic survey targeted on these features revealed complex anomaly patterns with high amplitudes (>6000 nT) which

were interpreted using three-dimensional techniques. The source bodies are a distinctive suite of mafic intrusions of (?)Cretaceous age. (Auth.)

L-36304

Forsyth, D.W., Ehrenbard, R.L., Chapin, S., **Anomalous upper mantle beneath the Australian-Antarctic discordance,** *Earth and planetary science letters,* Aug. 1987 84(4), p.471-478, 27 refs.

Within the Australian-Antarctic discordant zone, residual depth anomalies approach 100 m. In sea floor younger than 10 Ma that is more than 500 m deeper than expected, Rayleigh wave phase velocities are significantly faster than in sea floor of comparable age in the Pacific. In this area, the shear wave velocity in the 20-40 km depth range is unusually fast, indicating that the lithosphere develops more rapidly than usual from an asthenosphere that is perhaps cooler than average. Beneath this older sea floor, the low-velocity zone in the oceanic mantle is much less pronounced than beneath sea floor of comparable age in the Pacific. (Auth.)

L-36305

Bachtadse, V., Van der Voo, R., Hälbich, I.W., **Paleomagnetism of the western Cape Fold belt, South Africa, and its bearing on the Paleozoic apparent polar wander for Gondwana,** *Earth and planetary science letters,* Aug. 1987 84(4), p.487-499, 42 refs.

In order to test two different proposals for the poorly defined African Paleozoic apparent polar wander path (APWP), a paleomagnetic study was carried out on Ordovician through Carboniferous clastic sediments from the Cape Fold belt, west of the 22nd meridian. One proposal involves a relatively simple APWP connecting the Ordovician Gondwana poles in North Africa with the Late Paleozoic poles to the east of South Africa in a more or less straight line crossing the present equator in the Devonian. The other proposal adds a loop to this path, connecting Ordovician poles in North Africa with poles to the southwest of South Africa and then returning to central Africa. This loop would occur mainly in Silurian time. New results reported herein yield paleopoles in northern and central Africa for Ordovician to lowermost Silurian and Lower to Middle Devonian formations. The best determined paleopole of our study is for the Early Ordovician Graafwater Formation and falls at 28N, 14E. The other paleopoles are not based on sufficient numbers of samples, but can help to constrain the apparent polar wander path for Gondwana. The results give only paleopoles well to the north of South Africa and no directions within the proposed loop are observed. Hence, if the loop is real, it must have been of relatively short duration (60-70 Ma) and be essentially of Silurian/Early Devonian age, implying very high drift velocities for Gondwana (with respect to the pole) during that interval. (Auth.)

L-36370

Navarro, F., **Suitability of the South Pole for observation of long-period motions of the Earth** [Idoneidad del Polo sur para el estudio de los movimientos de la tierra de largo período], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.160-171, 12 refs., In Spanish with English summary.

The South Pole provides an unusually good geographic location from which to investigate several important geophysical problems. Its axial location removes a large part of the effects of rotation and ellipticity on the free oscillations of the Earth. It lies on great circle paths which coincide with portions of the oceanic ridges and thus presents an excellent opportunity to study phase velocities sensitive to mantle structure under them. The axial position of the South Pole and the long distance to the oceans make it an ideal place to study long-period tides. (Auth.)

L-36373

Ortiz, R., García, A., Giménez, E., **Development of geophysical instrumentation to operate in antarctic conditions** [Desarollo de instrumentación geofísica para su operación en condiciones antárticas], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.197-204, 7 refs., In Spanish with English summary.

A data acquisition system, designed to operate on automatic geophysical stations in the extremely cold antarctic environment, is described and evaluated. The equipment consists of a low power microprocessor, a controlled data logger, and radio telemetry and analog modules for seismic and geomagnetic recorders.

L-36374

Ortiz, R., Vila, J., Correig, A., Viramonte, J., **Preliminary study of seismic activity on Deception Island** [Actividad sísmica en Decepción. Estudio preliminar], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.205-216, 6 refs., In Spanish with English summary.

In the summer of 1986-1987, a small seismic network was installed on Deception I. to study the frequency and interaction of regional earthquakes. During Jan. and Feb. more than 400 events, of 0.7-2.9 magnitude, were recorded locally; a few other events, of an approximate 3.5 magnitude, were recorded at 40 km from the island. A relationship is found between the local and regional events.

L-36422

Szymanski, A., **Results of geomagnetic observations, Polish antarctic station Arctowski, King George Island, 1980-1981,** *Polska Akademia Nauk. Instytut Geofizyki. Publications of the Institute of Geophysics, Polish Academy of Sciences,* 1985 C-22(182), 112p., 2 refs.

This volume contains a plan of Arctowski Station and results of observations of the geomagnetic field, carried out at the station, for the years 1980-1981. A description and photographs of the pavilion and instruments for magnetic recording are given, along with the tabulated data which include the following: scale-values of magnetic variographs and adopted base values; three-hour range K indices, magnetic character figure C and magnetic phenomena; monthly mean values of magnetic elements; and mean hourly values for declination, horizontal intensity and vertical intensity. Determination of new corrections to QHM-410 operating at the Arctowski Station is described in an addendum. The obtained corrections are H=-47 nT (horizontal component) and D=-3 (declination).

L-36507

Yuen, D.A., Gasperini, P., Sabadini, R., Boschi, E., **Azimuthal dependence in the gravity field induced by recent and past cryospheric forcings,** *Geophysical research letters,* Aug. 1987 14(8), p.812-815, 14 refs.

Present-day glacial activities and the current variability of the antarctic ice volume can cause variations in the long-wavelength gravity field as a consequence of transient viscoelastic responses in the mantle. The azimuthal dependence of the secular variations of the

gravitational potential is studied. It is found that the non-axisymmetric contributions are more important for recent glacial retreats than for Pleistocene deglaciation. Changes in land-based ice covering Antarctica can be detected by monitoring satellite orbits and their sensitivity to variations in gravitational harmonic for degree *l* greater than 3. Resonances in satellite orbits may be useful for detecting these azimuthally-dependent gravity signals. (Auth.)

L-36508

Sabadini, R., Smith, B.K., Yuen, D.A., **Consequences of experimental transient rheology,** *Geophysical research letters,* Aug. 1987 14(8), p.816-819, 15 refs.

Recent analyses of transient creep data for lower crustal and upper mantle substances show that the parameters of the Burgers' body rheological model, used up to now by geodynamicists, have much lower ratios of the short-term to long-term viscosities than the laboratory values. These data are used to constrain the viscosity contrast across a 670 km discontinuity. Results show that the previously inferred viscosity variations are now reduced by about a factor of ten in the new transient models. This finding is in agreement with the revised viscosity estimate based on long-wavelength geoid anomalies and seismic tomography. It is shown that time-dependent perturbations to the gravity field from recent ice movements in Antarctica are not at all small. (Auth.)

L-36703

Miura, S., Kaminuma, K., Koyama, E., **Gravity survey in Ross Island, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.6-14, 6 refs.

Gravity surveys have been carried out in Ross I. every summer since 1982/83 in order to investigate the subsurface structure of the active volcano, Mount Erebus. The Bouguer anomaly has been calculated at each station. The anomaly is high in the whole island except the western and southwestern coasts, where anomalies are about zero or negative, and a higher anomaly exists in the summit area of Mount Erebus. The structure of Mount Erebus might be classified as a type similar to the Kilauea Volcano of Hawaii I. or the Osima Volcano of Japan. (Auth.)

L-36715

Takigami, Y., Kaneoka, I., Funaki, M., **Age and paleomagnetic studies for intrusive and metamorphic rocks from the Sör Rondane Mountains, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings. No.1, Tokyo, National Institute of Polar Research, 1987, p.169-177, 10 refs.

Two Ar-40/Ar-39 and five K/Ar ages and the virtual geomagnetic pole (VGP) were obtained for metadolerite dikes and gneiss at 3 sites, 1550 Nunatak, Brattnipane and Austkampane of the Sör Rondane Mountains. The radiometric age of 1550 Nunatak was determined to be 440-450 Ma, which is the youngest so far reported in this area. The obtained VGP is similar to those estimated from rocks of other areas in Antarctica in Cambrian-Ordovician age, but is different from that reported in an earlier paper.

L-36758

Gupta, H.K., Varma, A.K., **Magnetic characteristics in Antarctica over geological contacts in Schirmacher Hill region and the ice shelf near Dakshin Gangotri (70 deg 05' 37"S, 12 deg 00' 00"E),** *India. Department of Ocean Development. Technical publication,* 1986 No.3, p.231-239, 10 refs.

Total intensity measurements of earth's magnetic field were carried out in the Schirmacher Hills region and on the ice shelf in the vicinity of Dakshin Gangotri Station using a pair of proton precession magnetometers. Three magnetic traverses totalling about 3 line km, with an average station interval of 7 m and 6 short criss-crossing magnetic profiles totalling over 2 line km in the Schirmacher Hills region were found suitable for further processing. Geological contacts between garnet biotite gneiss and sulphide bearing banded gneiss are associated with sharp magnetic anomalies of the order of several hundred nT. The criss-cross magnetic profiles in the augen gneiss terrain permitted contouring magnetic anomalies at 100 nT interval. Quantitative interpretation of 5 anomalies has been carried out using conjugate points and symmetrical curve procedures, and geometric parameters of possible causative bodies are estimated. (Auth. mod.)

L-36782

Grunow, A.M., Kent, D.V., Dalziel, I.W.D., **Mesozoic evolution of West Antarctica and the Weddell Sea basin: new paleomagnetic constraints,** *Earth and planetary science letters,* Nov. 1987 86(1), p.16-26, 43 refs.

Between the Middle Jurassic and Early Cretaceous, Weddellia remained attached to West Gondwanaland while East Antarctica moved southward clockwise 30 deg and moved sinistrally approximately 2500 km relative to East Antarctica, to its present-day position. The Early to mid-Cretaceous is suggested to be the time of the main if not initial opening of the Weddell Sea. (Auth.)

L-36879

Sabadini, R., Yuen, D.A., Gasperini, P., **Mantle rheology and satellite signatures from present-day glacial forcings,** *Journal of geophysical research,* Jan. 10, 1988 93(B1), p.437-447, 55 refs.

By means of transient viscoelastic modeling it has been demonstrated that the longwavelength components of the Earth's gravitational field are sensitive to current glacial discharges and also to the growth of the antarctic ice sheet occurring today. In the model, corrections to the gravitational harmonic coefficient (GHC) value currently attributed solely to the Pleistocene deglaciation may be as large as 30%, depending on the magnitude of growth of the antarctic ice sheet. These effects would cause some uncertainties, no more than a factor of two or three, in the lower mantle viscosities extracted from the GHC data for the lower branch solutions. Although there are uncertainties in current glacial melting estimates, the contamination of the inverted viscosity would be linearly proportional to the uncertainties in the input parameters, for errors in the small amplitude regime, 0(10%). Larger uncertainties would require detailed sensitivity analysis for assessing the impact on the inferred viscosity solutions. These results for the higher zonal harmonics reveal that Antarctica's mass balance may conceivably play an important role. (Auth. mod.)

L-36925

Grushinskiĭ, N.P., Grushinskiĭ, A.N., Mikhaĭlov, B.O., **Main features of the antarctic gravity field** [Osnovnye cherty gravitatsionnogo polia Antarktiki], *Antarktika; doklady komissii,* 1987 No.26, p.5-11, In Russian. 5 refs.

Calculated are approximate average gravity anomaly values in 300-km-sided trapezia of antarctic regions investigated for the first time. Based on the actual anomaly field in studied areas, and approximations in the white spots, the geoid elevation and perpendicular deflections are plotted. The geoid elevation correlates with elevations of the surrounding ocean obtained from Seasat altimeter data. Averaged gravimetric maps are presented.

L-36926

Grushinskiĭ, A.N., **Regional gravity field of the Antarctic** [Regional'noe gravitatsionnoe pole Antarktidy], *Antarktika; doklady komissii,* 1987 No.26, p.12-18, In Russian. 3 refs.

Calculated are average free-air and Bouguer anomaly values in 220-km-sided trapezia based on an antarctic gravimetric map on a 1:5,000,000 scale. The anomaly calculations and the degree of the anomaly field are evaluated for accuracy. Averaged anomaly maps are presented.

L-37116

Dowson, M.J., Buckingham, J.P., Simmons, D.A., **Notes on geomagnetic repeat mesurements at Grytviken, April 1987,** *British Antarctic Survey. Bulletin,* Feb. 1988 78, p.49-52, 3 refs.

Geomagnetic repeat measurements were made on South Georgia to provide an update of the absolute field values. The results, reproduced in this report, confirm the trend of the drift in declination to have reversed at the site since the late 1970s. They also indicate a decrease in the secular change of the horizontal component since that time. The annual rate of decrease of the vertical component is comparable to that of recent years, but will require further measurements in the future to determine how this is changing. (Auth.)

L-37344

Le Roex, A.P., **Crust-mantle evaluation in the vicinity of the Bouvet triple junction—a synthesis,** *South African journal of antarctic research,* 1987 17(2), p.90-104, With Afrikaans summary. 36 refs.

Detailed petrologic and geochemical studies of lavas from the vicinity of the Bouvet triple junction indicate that the lavas show a wide range in compositional differentiation extending from Mg-rich picrite basalts to Fe-Ti rich ferrobasalts. Furthermore, in addition to normal geochemically 'depleted' mid-ocean ridge basalt *(MORB),* geochemically 'enriched' *MORB* occurs in abundance throughout the region but is absent to the east of 15E. Tectonic location exerts an important control on the degree of low pressure fractional crystallization experienced by the lavas prior to eruption, but has little effect on degree of geochemical 'enrichment' or source region composition. An integrated model is proposed whereby the mantle source region of 'enriched' lavas from the Southwest Indian and American-Antarctic ridges is invaded by low volume partial melts related to the upwelling Bouvet mantle plume. The mantle source region of 'enriched' *MORB* from the southern Mid-Atlantic ridge has been enriched by a similar process but related to the upwelling of the geochemically distinct 'Shona' mantle plume. (Auth.)

L-37481

Kaminuma, K., Akamatsu, J., **Local earthquakes around Syowa Station, Antarctica,** *Antarctic record,* Nov. 1987 31(3), p.177-185, In Japanese with English summary. 18 refs.

There were no earthquakes located in the antarctic continent before the International Geophysical Year (IGY) in 1957. About ten seismic stations have been operated on the antarctic continent since IGY. Four earthquakes were reported in and around the antarctic continent since 1968. One of the four earthquakes which occurred in 1980 was located in Queen Maud Land in the east antarctic shield area. The occurrence of small and microearthquakes around each seismic station has been reported. However, no earthquake locations were determined because the earthquakes were recorded at only one or two seismic stations. A tripartite seismic network of radiotelemetry was established at Showa Station in 1987. Some tectonic earthquakes were recorded by the network. The magnitude of the earthquakes is less than 3, and P-S is about 20 s. The earthquakes are estimated to be located at about 160 km northeast of Showa Station. (Auth.)

L-37508

Driscoll, M.L., Parsons, B., **Cooling of the oceanic lithosphere—evidence from geoid anomalies across the Udintsev and Eltanin fracture zones,** *Earth and planetary science letters,* May 1988 88(3/4), p.289-307, 22 refs.

Combined measurements from fracture zones in the South Pacific are not consistent with either the plate model or boundary layer model of cooling. To examine this inconsistency geoid offsets on Seasat profiles were measured across the Udintsev and Eltanin fracture zones in the South Pacific and the robustness of the measurement technique was tested. A second-order polynomial that included a step function centered on the fracture zone was used to estimate the regional geoid and the geoid offset. Using exclusion widths of between 150 and 200 km on most profiles, geoid slope versus average age plots were constructed for each of the limbs of the two fracture zones. Similar trends were found on both the east and west limbs of the Eltanin and the east limb of the Udintsev. The trends were inconsistent with a single thermal plate thickness and instead showed an initial decrease in slope between 0 and 35 m.y., followed by an abrupt increase followed again by a decrease in slope. In contrast, the west branch of the Udintsev shows an increase in geoid slope values between 20 and 35 m.y., followed by a decrease. The fracture zones being studied are components of the Pacific-Antarctic Rise between appr. 50-65S. (Auth. mod.)

See also:
C-36924 D-34755 E-34860 E-34898 E-35042 E-35115 E-35163 E-35794 E-35986 E-36164 E-36313 E-36415 E-36579 E-36980 F-36290 F-36351 F-37214 I-36723 J-35337 J-36582 J-36705 J-37518

M. POLITICAL GEOGRAPHY

M-34880
Barceló, J.J., III, **International legal regime for Antarctica,** *Cornell international law journal,* Summer 1986 19(2), p.155-161, 20 refs.

DLC JX1.C63

This article serves as an introduction to a symposium on the international legal regime for Antarctica held at Cornell Law School in Oct. 1985. It examines the potential for conflict over the establishment of a mineral regime between the nations that have governed Antarctica under the 1959 Antarctic Treaty and non-treaty nations, and among states with overlapping territorial claims.

M-34881
Francioni, F., **Legal aspects of mineral exploitation in Antarctica,** *Cornell international law journal,* Summer 1986 19(2), p.163-188, 84 refs.

The lawfulness of mineral exploration and development in Antarctica is examined under the Antarctic Treaty and under customary international law. Substantive aspects of the proposed mineral regime and the mineral regime as an institution are discussed with the conclusion that, in order to capture the true essence of the common heritage spirit, antarctic resources must not be allocated according to "first come, first served" rule.

M-34882
Simma, B., **Antarctic Treaty as a treaty providing for an "objective regime",** *Cornell international law journal,* Summer 1986 19(2), p.189-209, 92 refs.

The analysis in this paper develops in two steps: three theoretical approaches, that have been suggested to account for valid and binding effects of objective treaty regimes, are specified in the first step; in the second, considerations are put forward on the position of the Third World states toward a future regime on antarctic mineral resources worked out by the signatories of the Antarctic Treaty.

M-34883
Oxman, B.H., **Antarctica and the new Law of the Sea,** *Cornell international law journal,* Summer 1986 19(2), p.211-247, 125 refs.

The viability of the Antarctic Treaty System is considered in relation to existing international law and the Law of the Sea. The emphasis is on legal and political aspects, but discussions include environmental and economic concerns. It is concluded that the right of access to antarctic minerals is likely to be far less certain and less free of foreign political control under an antarctic arrangement of the kind now being discussed than it is under the deep seabed mining provisions of the Law of the Sea Convention.

M-34884
Conforti, B., **Territorial claims in Antarctica: a modern view to deal with an old problem,** *Cornell international law journal,* Summer 1986 19(2), p.249-258, 23 refs.

Modern principles are formulated illustrating the course that should be taken in analyzing territorial claims in Antarctica. These theories suggest that the claimant states do not enjoy any rights superior to those enjoyed by the other states carrying out activities in Antarctica. It is suggested that this privilege is granted by the Antarctic Treaty in Article IX, paragraph 2.

M-34886
Hayashi, M., **Antarctica question in the United Nations,** *Cornell international law journal,* Summer 1986 19(2), p.275-290, 94 refs.

The United Nations debate on Antarctica in 1983 and 1984 is described. It includes the Malaysian initiative to present the question to the United Nations, the discussions in the 38th and 39th sessions, and the principal issues raised in the debate. The latter cover territorial claims of sovereignty, adequacy of the Treaty regime, and the proposed international management of Antarctica consisting of five points described as practical measures deserving priority of attention.

M-34887
Colson, D.A., **United States position on Antarctica,** *Cornell international law journal,* Summer 1986 19(2), p.291-300, 13 refs.

This discussion of the United States position on Antarctica covers American political and security interests as well as environmental, scientific, and resource interests. The continuity and consistency of the United States position over many years is illustrated by quotes from a diplomatic note of May 2, 1958, and a speech by President Eisenhower on the subject. Two major challenges to this position are identified: the growing, general, interest in antarctic mineral resources, and the United Nations involvement in this matter.

M-35116
Gardam, J.G., **Management regimes for antarctic marine living resources—an Australian perspective,** *Melbourne University law review,* Dec. 1985 15(2), p.279-312, Numerous refs.

Measures which have been taken to regulate the exploitation of the living resources of the Antarctic region are examined. Initially, this involves a discussion of the legal framework in relation to the Antarctic, namely the Antarctic Treaty of 1959. Then follows an analysis of the conservation measures adopted and the Australian response thereto, with respect to whaling, the fauna and flora of the area and sealing. A brief history of the negotiations leading up to the Convention for the Conservation of Antarctic Marine Living Resources introduces a critical examination of the regime established by the Convention, in particular its structure, the area and scope of the Convention, its objectives and its enforcement and operation. (Auth.)

M-35143
Millar, T.B., ed, **Australia, Britain, and Antarctica,** London, Australian Studies Centre, University of London, 1986, 111p., Papers of a conference held at the Australian Studies Centre, June 4, 1986. For individual papers see A-35145, A-35146, M-35144, M-35147 through M-35151.

DLC JX4084.A5A97 1986

The Antarctic Treaty entered into force on 23 June 1961, so a review conference could be held, if requested by a Contracting Party, any time after 23 June 1991. It is in anticipation of such a conference that a great deal of lobbying has been going on in order to bring changes to some of the Treaty's terms, widen its membership, publicize its activities. The specific point at issue, sometimes at the forefront of the discussion and sometimes latent, is the possibility of there being exploitable mineral resources on the continent. The purpose

of the conference whose papers constitute this volume was to examine some of these questions, especially from a British and an Australian perspective, and specifically to see whether there is a reasoned basis to the current degree of political interest in Antarctica, whether nationalistic or internationalist pressures are likely to predominate in the coming years both over resource exploitation and scientific cooperation, and whether those who use Antarctica are acting to protect its unique natural environment. (Auth.)

M-35144

Davis, B.W., **Background to the present situation,** Australia, Britain and Antarctica, edited by T.B. Millar, London, Australian Studies Centre, University of London, 1986, p.4-18, Numerous refs.

DLC JX4084.A5A97 1986

In setting the stage for understanding the present antarctic situation, a brief background to the Antarctic Treaty is provided and four key concepts which have provided stability are discussed. The current rising interest in Antarctica is noted and ambiguities in the Treaty are viewed as a possible Achilles heel which could cause the Treaty to fail. Opposing viewpoints are defined with positions bringing about divisions within and between nations. Several of the emerging issues which are straining the Treaty are briefly discussed: utilization of the renewable and non-renewable resources; territorial rivalries, the antarctic decision-making process; private expeditions and tourism; sanctions against South Africa; and suggested international regimes. Summaries of the arguments pro and con internationalization of Antarctica are presented.

M-35147

Bleasel, J., **An Australian perspective,** Australia, Britain and Antarctica, edited by T.B. Millar, London, Australian Studies Centre, University of London, 1986, p.37-50.

DLC JX4084.A5A97 1986

Antarctica has a direct bearing upon Australia's national security interests, its climate, ocean currents and environment. At the same time, Antarctica offers unique opportunities for scientific endeavour and possibly for economic benefits in the future. These concepts are expounded; global benefits derived from the operation of the Antarctic Treaty are examined. Alterations of viewpoints promulgated from within the Treaty System have served to strengthen the Treaty and provide a wider range of accommodation for those nations whose antarctic experience is limited. In doing these things the Treaty nations refute the arguments of those who would nullify the Treaty and place Antarctica under the aegis of the United Nations.

M-35148

Watts, A.D., **A British perspective,** Australia, Britain and Antarctica, edited by T.B. Millar, London, Australian Studies Centre, University of London, 1986, p.51-59.

DLC JX4084.A5A97 1986

Britain has four primary interests in Antarctica: sovereignty for British antarctic territory; maintenance of peace; development of science and protection for the environment; and economic benefits from resources that may be found. These interests are discussed in terms related to provisions of the documentation comprising the Antarctic Treaty System. Negotiations in progress on an antarctic minerals regime are being engaged in in an atmosphere devoid of pressure from outside entrepreneurs who would insist on speedy action. This before-the-fact process is regarded as an act of prudent forethought. Activities in the UN *vis à vis* Antarctica are reviewed and deemed to be based on mistaken beliefs as to possible wealth in Antarctica, the exclusivity of the Antarctic Treaty, and the ruination of Antarctica through commercial exploitation. Britain believes the Treaty has attained in Antarctica global benefits that other treaties have failed to achieve elsewhere.

M-35149

Beck, P.J., **Political challenges to the Treaty regime,** Australia, Britain and Antarctica, edited by T.B. Millar, London, Australian Studies Centre, University of London, 1986, p.60-79, 41 refs.

DLC JX4084.A5A97 1986

A brief overview in an international context is given of the first 25 years of development and operation of the Antarctic Treaty System. It is pointed out that pre-1961 actual or perceived rivalries in the region have subsided under the Treaty, though they remain unsolved, and the continent has in fact been an area of peace and science. Various international attitudes toward the ATS have emerged, ranging from support and participation through acquiescenece and indifference to strong criticism and demands for a replacement scheme. Since 1982, a bloc of Third World governments, led principally by Malaysia, has been strongly critical of the ATS, pushing three adverse resolutions through the UN General Assembly which resulted in a polarization of views. The debate as it continued among the pros and cons is discussed. An annex provides a précis of the arguments seeking to move the management of Antarctica to the UN. A caveat precedes the annex and says in effect that universal management does not equate with better management.

M-35150

Wilson, R., **Environmental critique of the Antarctic Treaty System,** Australia, Britain and Antarctica, edited by T.B. Millar, London, Australian Studies Centre, University of London, 1986, p.80-92, Numerous refs.

DLC JX4084.A5A97 1986

The ATS is reviewed as to the antarctic environmental protection provided for in the Antarctic Treaty, recommendations of Consultative Parties, and the formal agreements and conventions entered into by the Consultative Parties. In practice, the environment has not fared as well as the written agreements require or the pious words of the CPs would suggest. Numerous instances of environmental damage are cited ranging from poor management of waste materials through roughshod construction practices and disregard of areas of scientific interest to abuse of animals. It is a matter of grave concern that in none of the cited instances was the offending party called to account for violations of the Treaty. There is a great unwillingness among Consultative Parties to criticize each other for wrong doings.

M-35151

Miller, T.B., **The way ahead,** Australia, Britain and Antarctica, edited by T.B. Millar, London, Australian Studies Centre, University of London, 1986, p.93-98, 2 refs.

DLC JX4084.A5A97 1986

Materials presented and views expressed during the conference are reviewed and summarized. Much of the discussion centered on the strengths and inadequacies of the Antarctic Treaty System. On balance, its strengths seem to outweigh its weaknesses, with the major flaw being the lack of enforcement powers. The Treaty system will work as long as there is a will among the decision makers to ensure that it works. There is a voice urging that Antarctica be placed under the aegis of the United Nations yet there is no guarantee that management by the 150 members of the UN will produce better results than the ATS. In fact, recent history would indicate that UN members together are not capable of managing anything. It seems necessary to strengthen the Treaty with significant enforcement powers before the Treaty *de jure* becomes the Treaty *de facto.*

M-35152

Joyner, C.C., Lipperman, P.J., **Conflicting jurisdictions in the southern ocean: the case of an antarctic minerals regime,** *Virginia journal of international law,* Fall 1986 27(1), p.1-38, 125 notes and refs.

This article examines the legal questions stemming from the jurisdictional conflict over submarine resources in the Antarctic. To provide some perspective, the opening section describes the legal status of the southern ocean. The next section assesses the specific jurisdictional questions that conflicting minerals regimes would pose for the antarctic continental shelf. Coastal state sovereignty and regulatory authority on the antarctic offshore is evaluated, with special reference to the territorial claims made by various states to portions of the continent. The concluding section seeks to examine the range of possible accommodations available for resolving these jurisdictional questions, and puts forth some recommendations for critical consideration.

M-35204

Myhre, J.D., **Antarctic Treaty System: politics, law, and diplomacy,** Boulder, Westview Press, 1986, 162p., Refs. p.151-157.

The expressed purpose of this study is to examine how and to what extent the Antarctic Treaty, and its supporting agreements and arrangements collectively called the Antarctic Treaty System, overcame the early challenges to their survival, and to look at the present and future challenges the System faces. This includes a review of the legal and political problems arising from some nations' claims to sovereignty in Antarctica, and of the initial efforts to create an international administration for the region; a study in detail of the terms of the Treaty and the rules of procedure for the consultative meetings. Turning to the diplomatic events that molded the Treaty system, the author concentrates on the issues that emerged in the 1960s: conservation, the role of Meetings of Experts, the position of the Scientific Committee on Antarctic Research within the Treaty system, the obligations of acceding states to uphold previous agreements, and the Consultative Powers' failure to establish an Antarctic Secretariat. Finally, the two main challenges to the system's survival—mineral extraction and Third World opposition to the present structure—are reviewed. Two appendixes, one a full text of the Antarctic Treaty and the other of the Beeby Draft, are included.

M-35213

Beck, P.J., **International politics of Antarctica,** New York, St. Martin's Press, 1986, 332p., Refs. p.320-322.

DLC JX4084.A5 B4

This study is concerned with how Antarctica's role in international politics has developed in the past and might develop in the future. What is offered here is in the nature of a descriptive and interpretative essay designed to examine Antarctica's international political role from the perspectives of the antarctic past, present and future through the adoption of a multi-disciplinary approach on account of the alliance of political, legal, economic, scientific, environmental and other themes characteristic of the continent's affairs. An attempt has been made to assume an international outlook.

M-35236

Beck, P.J., **Britain's antarctic dimension,** *International affairs,* Summer 1983 59(3), p.429-444, Numerous refs.

DLC JX1.I53

Policies of the British government toward the southwest Atlantic and Antarctica are reviewed from the 1920s through the post-1982 Falklands war period. These policies ranged from the intent to claim the entire continent in the early period through a greatly diminished interest in the 1970s and early 1980s, to a reawakening of interest and renewed activities from mid-1982. The increased funding for antarctic research, the revised Shackleton Report of 1982, and the potential of antarctic resources are all discussed and considered as significant indicators of a change in official British attitudes toward the whole southern region. Yet a nagging question remains: is the rejuvenation of British interest in Antarctica a durable future policy or will it revert to the apathy of the pre-1982 period.

M-35239

Parriott, T.J., **Territorial claims in Antarctica: will the United States be left in the cold,** *Stanford journal of international law,* Spring 1986 22(1), p.67-121, 329 refs.

DLC JX1.S7

This article first describes the physical characteristics and resources of Antarctica, then reviews theories supporting claims of sovereignty over Antarctica. Next, it considers the effect of the Antarctic Treaty and the LOS Convention on such claims and discusses potential frameworks for resolution of the issue. Finally, the author reviews and critiques U.S. policy concerning Antarctic territorial claims, concluding that the United States must establish a clearly articulated, well-reasoned antarctic policy that is designed to protect U.S. rights.

M-35399

Primeras Jornadas Latinoamericanas sobre la Antártida, Rosario, Sep. 1986, **[Proceedings of the] First Latin American Days on Antarctica, Rosario, Argentina, Sep. 1986** [Primeras Jornadas Latinoamericanas sobre la Antártida, Rosario, Republica Argentina, Septiembre 1986], Rosario, Asociación Argentina de Derecho Internacional, 1986, 72p., In Spanish and Portuguese. Refs. passim. For individual papers see M-35400 through M-35403.

This booklet consists mainly of 4 papers presented at a conference, held in Rosario, Argentina, on the issue of the interests of Latin American countries in Antarctica. An introduction and the program precede the presentations. Conclusions are given at the end which include statements regarding the need of an effective Antarctic Treaty System; comments to the effect that the current Antarctic Treaty System has not been considered adequately by the United Nations General Assembly; and recommendations dealing with cooperation among the Latin American Antarctic Treaty consultative parties in the promotion of studies and resources meant to include and involve non-member nations of Latin America in projects concerning the antarctic region.

M-35400

Molinari, A.E., **Question of Antarctica in the United Nations—Resolution 40/156: Position of Latin American countries** [Cuestión de la Antártida en las Naciones Unidas—Resolución 40/156 * Posición de los países latinoamericanos], Primeras Jornadas Latinoamericanas sobre la Antártida. Rosario, Sep. 1986, Rosario, Asociación Argentina de Derecho Internacional, 1986, p.7-19, In Spanish. 6 refs.

The stated purpose of this article is to analyze Resolution 40/156, approved by the United Nations General Assembly on Dec. 16, 1985, in reference to the question of Antarctica, and to use it as a basis for the study of the position of Latin American countries on that question. The 3 parts considered in the analysis include continuation of antarctic studies begun in 1983; the issue of antarctic natural resources in general, and the future of minerals regime in particular; and the exertion of pressure, in the frame of the antarctic question, on the government of South Africa regarding its apartheid policy. The position of each country on the above 3 points, as reflected in its vote upon the issues, is commented on, and a detailed list of the votes is given.

M-35401

Colacrai de T., M., **Current trends in the antarctic subsystem** [Tendencias actuales en el subsistema antártico], Primeras Jornadas Latinoamericanas sobre la Antártida. Rosario, Sep. 1986, Rosario, Asociación Argentina de Derecho Internacional, 1986, p.21-43, In Spanish. 6 refs.

The article begins with a historical review of the international system in terms of division of power between East and West, and the diffusion of that power with the emergence of the Third World which, in turn, led to a peaceful coexistence between nations. The Antarctic Treaty, considered an outcome of international organization, is then reviewed. The analysis centers on the antarctic subsystem, represented by three groups with fundamentally separate interests in Antarctica: the developed countries, the "Greenpeace" environmentalists, and the underdeveloped countries which, at present, are not included in the Antarctic Treaty. Conflicts between the groups, generated by the issue of exploitation of potential antarctic resources, and the impact these conflicts have on Latin American countries, are discussed.

M-35402

Caubet, C., **Questions about Antarctica: some Brazilian perspectives** [As questões antárticas: algumas perspectivas brasileiras], Primeras Jornadas Latinoamericanas sobre la Antártida. Rosario, Sep. 1986, Rosario, Asociación Argentina de Derecho Internacional, 1986, p.45-53, In Portuguese. 23 refs.

A brief history of Brazil's participation in antarctic affairs is given, including its first and second expeditions in 1982 and 1984, the opening of the Ferraz Station on King George I., and Brazil's joining the Antarctic Treaty Consultative Parties on July 12, 1983. The stated purpose of this presentation is to convey Brazil's official stand on Brazil's right to be involved in the Antarctic and the advantages of such involvement; to reiterate the desirability of the polar partitioning theory in pursuit of a territorial claims settlement among South American countries; and to stress the necessity of mutual cooperation among those countries in support of common interests in the Antarctic. Three provisions are recommended: provision of common funds to promote participation in the development of antarctic mineral resources; participation in joint ventures by various South American countries; and strengthening of the Consultative Commission to increase its power to promote interchange of scientific and technological information within the regime.

M-35403

Rey C., E.J., **Territorial claims in Antarctica and their projection into sea spaces** [Las pretensiones territoriales en la Antártida y su proyección en los espacios marítimos], Primeras Jornadas Latinoamericanas sobre la Antártida. Rosario, Sep. 1986, Rosario, Asociación Argentina de Derecho Internacional, 1986, p.55-69, In Spanish. 31 refs.

The boundaries of antarctic territories claimed by various nations are defined, and the various theories on which they are based are individually described and evaluated according to the principles of international law. The Antarctic Treaty articles which address the sovereignty question, and the related exploitation of antarctic resources, are reviewed. Next, the Laws of the Sea are examined as applied to the "exclusive" and "comprehensive" economical zones, and whether national jurisdictions could be stretched over antarctic waters. The article is written in the form of an essay and, for reasons of impartiality, no conclusions are offered.

M-35435

Pittman, H.T., **Some geopolitical trends in Argentina, Brazil and Chile. New applications of the law of valuable areas** [Algunas tendencias geopolíticas específicas en los países del ABC. Nuevas aplicaciones de la ley de las áreas valiosas], *Revista de ciencia política,* 1981 No.1-2, p.27-70, In Spanish. 38 refs.

DLC JA5.R495

Described and examined are current geopolitical trends of Latin American countries which expand the conflict of overlapping territorial claims in Antarctica to its surrounding oceans. The analysis reveals the intentions of the governments involved to defend, populate and integrate the empty spaces they claim, and to seek new acquisitions in adjacent areas for the exploitation of new resources. The disputes which these intentions create between competing countries, and their possible consequences, are discussed.

M-35436

Child, J., **Geopolitical thought and four conflicts in South America** [Pensamiento geopolítico y cuatro conflictos en Sudamérica], *Revista de ciencia política,* 1981 No.1-2, p.71-104, In Spanish. 46 refs.

DLC JA5.R495

The third of the four South American conflicts discussed in this article concerns the antarctic region and the overlapping claims of different countries over part of the territory. The historic antecedents are reviewed, including past disputes and their settlement between countries involved. It is expected that current tensions between Chile and Argentina, exacerbated by economic considerations regarding potential exploitation of antarctic resources, will affect South American stability for years to come.

M-35631

Laws, R.M., **Cooperation or confrontation,** Antarctic science, D.W.H. Walton, ed., Cambridge, Cambridge University Press, 1987, p.249-265.

DLC G860.A555 1987

Four possible justifications are presented for maintaining scientific research programs in Antarctica: they are the means to defuse conflicts in the southern areas; they are outlets for intellectual curiosity; they have future value as applied research such as BIOMASS, CCAMLR, and CCAS; they are contributions toward understanding global/geospace effects of man-induced environmental changes. With the advent of antarctic mineral resources negotiations in 1977, the number of nations acceding to the Antarctic Treaty and Consultative Parties began to rise. By 1985 the numbers had increased from 12 to 32 and from 12 to 18 respectively. Additionally, UN members have begun to take a lively interest in Antarctica as have several non-governmental, conservation groups. All of these actions have de-stabilized an area which for twenty-five years has been the very epitome of stability under the banner of scientific research.

M-35727

Heap, J.A., **Antarctic Treaty System: environmental protection, conservation, and the question of competing use,** *Environment international,* 1987 13(1), p.15-18.

The Antarctic Treaty System consists of the Treaty itself, over 130 recommendations made under it, the Agreed Measures for the Conservation of Antarctic Fauna and Flora, the Convention for the Conservation of Antarctic Seals, and the Convention for the Conservation of Antarctic Marine Living Resources. Consultations have been held among parties to the Antarctic Treaty to elaborate an antarctic minerals regime. It has become clear that how to deal with issues of competing use has begun to emerge as an important political question. In such a context the development of an antarctic conservation strategy is a potentially helpful step. Competition of use, when it occurs, will be localized and different in different areas. In only tiny parts will it be severe, but these parts may be the biologically richest coastal areas. Various activities and their possible interactions are considered. It is concluded that any arrangement of antarctic activities which gives an automatic priority of one over others is wrong. Similarly, no activity should be subservient to all others. An antarctic conservation strategy needs to be developed and in its operation the concept of adaptive environmental assessment and management needs to be applied. Within the Antarctic Treaty System there are moves towards assessment. What is needed now is a framework within which such concepts can operate; that is, a conservation and environmental strategy. (Auth.)

M-35864
Joyner, C.C., Theis, E.R., **United States and Antarctica: rethinking the interplay of law and interests,** *Cornell international law journal,* Winter 1987 20(1), p.65-102, Numerous notes and refs.

The major purpose of this study is to evaluate whether the U.S. national interest—defined in terms of its legal, political, economic, and security dimensions—is best served by preserving the current antarctic regime. An additional concern is to sharpen the parameters of the debate on the relevance of international law as a factor in world politics. To accomplish these ends, this study is organized into 4 parts. Part I introduces antarctic issues that allow for a more thorough understanding of the themes elaborated on in the following sections. Part II examines the legal, political, economic, and security (i.e., strategic) values of the current regime for promoting U.S. interests. Part III surveys major elements of the "common heritage" concept. Part IV assesses whether restructuring the antarctic regime according to "common heritage" principles enhances or militates against the U.S. national interests. It is suggested that the best way to protect U.S. interests in Antarctica is to ensure that the 1959 Treaty framework is sustained. In order to respond to the proponents of the "common heritage" concept, the United States must articulate a coherent position in advance. Recognition of this need for a prompt response compels a cogent reevaluation of U.S. antarctic policy.

M-35953
Child, J., **Antarctica and Argentine geopolitical thinking,** Conference of Latin Americanist Geographers. Proceedings. Yearbook, Vol.12, edited by D.L. Clawson, Baton Rouge, Louisiana State University, 1986, p.12-16, 22 refs.

This study suggests that geopolitical thinking in Argentina, as well as in neighboring countries, has strongly influenced Argentine behavior toward Antarctica. Argentine geopolitical thinking has a highly nationalistic tone that views several other states with antarctic interests as potential antagonists. The analysis presented here runs counter to the prevailing optimistic thinking on antarctic issues, which stresses the success of the Antarctic Treaty regime and the cooperation that has characterized much of the exploration and scientific study of that continent. As we approach the critical year of 1991 when the Antarctic Treaty is open for review, we must realistically consider a less optimistic perspective, which, while not ignoring past successes, recognizes existing strains and potential conflicts. (Auth.)

M-36016
Beck, P.J., **Cold war: Britain, Argentina and Antarctica,** *History today,* June 1987 37(6), p.16-23, Refs. p.23.

Rivalry for the same part of antarctic territory has proved an important influence upon Anglo-Argentine relations during the present century; in turn, this relationship has constituted a central feature of the international politics of Antarctica. Key antarctic episodes in the development of Anglo-Argentine relations are examined with the help of archival source material, such as the events surrounding Operation Tabarin (1943-45) and the Hope Bay incident (1952). The Antarctic Treaty of 1959 has served to contain and moderate, rather than to resolve, Anglo-Argentine sovereignty rivalries, and the past quarter of a century or so has been characterized by both cooperative and confrontational tendencies. (Auth.)

M-36135
Triggs, G.D., ed, **Antarctic Treaty regime: law, environment and resources,** Cambridge, Cambridge University Press, 1987, 237p., For individual papers see 42-25 and 42-26 or A-36137, A-36145 through A-36147, E-36136, M-36138 through M-36144 and M-36148 through M-36152.

DLC JX4084.A5 A556 1987

The papers in this volume were written for an international conference held in London, Apr. 11-12, 1985. The conference, entitled 'Whither Antarctica?', was organized by the British Institute of International and Comparative Law. This work is intended to build upon the 1982 publication *Antarctic resources policy: scientific, legal and political issue,* edited by F. Orrego-Vicuña (see 13A-28807 or 38-690) by updating the legal, resources and environmental issues presently under consideration within the Antarctic Treaty system and, more recently, by the Secretary-General of the United Nations. An objective of this collection has been to provide a guide to the papers by including an introduction to each part which incorporates points made during conference discussion. Part I treats the physical environment and scientific research; Part II, legal issues; Part III, protecting the marine environment; Part IV, minerals regulation; and Part V, future policies. (Auth. mod.)

M-36138
Trolle-Anderson, R., **Antarctic Scene: legal and political facts,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.57-64.

DLC JX4084.A5 A556 1987

Negotiations leading to the Antarctic Treaty in 1959 are described. The Treaty's salient features are explained, most particularly the 'ingenious formula' of Article IV, which preserves the legal positions of the Treaty Parties on the question of territorial sovereignty. The practice of consensus in Consultative Party meetings, the 'legislative' procedure of Recommendations and the separate negotiations of inter-linked Conventions are set forth. In response to criticism that the Consultative Parties form a secretive club of states, the cooperative and evolutionary nature of the Antarctic system is stressed as a viable system impossible to recreate in today's political climate. (Auth.)

M-36139
Orrego Vicuña, F., **Antarctic Treaty system: a viable alternative for the regulation of resource-oriented activities,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.65-76, 27 refs.

DLC JX4084.A5 A556 1987

The author considers the Antarctic Treaty system to be the only viable alternative to regimes based on claims to territorial sovereignty or opposing assertions of universal management. The advantages of regulation through the Antarctic Treaty system are emphasized in contrast with wider international participation; criticisms of the system are rejected including those concerning the decision-making processes and lack of access to information. The question of the right of the Consultative Parties to regulate activities in Antarctica is met with a further question: on what basis does the international community, through the United Nations General Assembly, assert a superior right? (Auth.)

M-36140
Fox, H., **Relevance of Antarctica to the lawyer,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.77-87, 12 refs.

DLC JX4084.A5 A556 1987

The question is posed as to what contributions, if any, a lawyer can make to antarctic regulation. Four stages are suggested at which legal skills have value. The first concerns the validity of claims to territorial sovereignty which are advanced in accord with classical theories of acquisition. The second concerns the negotiation of techniques to accommodate the diverse legal interests of claimant, non-claimant and non-recognizing States. The third relates to development of the legislative processes of regulation through the Antarctic

Treaty system. The fourth, and most intellectually challenging, stage involves the fashioning of new concepts of territorial jurisdiction to resolve or diffuse these conflicting demands. Attention is drawn to the interests which should be considered by an international lawyer when assessing models for Antarctic resource management, including commercial, conservation, recreational and strategic interests which remain outside the ambit of current Antarctic regulatory processes. (Auth.)

M-36141

Triggs, G.D., **Antarctic Treaty System: some jurisdictional problems,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.88-109, Numerous refs.

DLC JX4084.A5 A556 1987

This paper takes up some legal questions, most particularly those jurisdictional problems which owe their origin to the fundamental conflict between states over territorial sovereignty. These are first, jurisdictional ambiguities which arise form the relationship between the 1982 Convention on the Law of the Sea and the Antarctic Treaty system; second, the criticisms of limited access to decision-making within the antarctic regime; and third, the legal implications for Antarctica of the concept of a common heritage of mankind. This last aspect provides a legal background to a subsequent discussion describing a Third World approach to the concept of a common heritage. (Auth.)

M-36142

Gulland, J.A., **Antarctic Treaty system as a resource management mechanism,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.116-127.

DLC JX4084.A5 A556 1987

The interlinked food chains and life cycles of antarctic marine species within the Antarctic Convergence are outlined. Some of the lessons which have been learned in past attempts to conserve and manage marine resources, particularly by the International Whaling Commission are described. The influence which the Antarctic Treaty has had upon the structure of the Conventions on Sealing and Antarctic Marine Living Resources is traced and a concession is made that measures adopted under CCAMLR to conserve Antarctic fisheries may appear 'cosmetic'. The position is taken that, imperfect though regulation may be under the Antarctic Treaty system, it remains the preferable alternative to universalisation. (Auth.)

M-36143

Holdgate, M.W., **Regulated development and conservation of antarctic resources,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.128-142, 15 refs.

DLC JX4084.A5 A556 1987

The thesis is developed that the exploitation of living resources must be regulated. Failure to control antarctic fishing in the past is documented, a failure which derived from unregulated exploitation of a common property of 'open-access' resource. Existing environmental regulation in Antarctica is described as establishing both general principles of conservation and use, and specific legislative process for recommendations and measures in certain areas of human impact. It is concluded that the Antarctic Treaty system has evolved methods of environmental conservation which, at the same time, facilitate scientific research. Defects in the system of environmental protection are listed, but it is believed that these defects can be resolved by change within the system itself. (Auth.)

M-36144

Bonner, W.N., **Recent developments in antarctic conservation,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.143-149.

DLC JX4084.A5 A556 1987

A history is provided of Antarctic Treaty Parties' attempts to regulate the environment and the present negotiations between the Scientific Committee on Antarctic Research and the International Union for the Conservation of Nature (IUCN) on World Conservation Strategy are described. The dramatic point is made that the Antarctic is already, by far, the largest natural reserve in the world. (Auth.)

M-36148

Triggs, G.D., **Negotiation of a minerals regime,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.182-195.

DLC JX4084.A5 A556 1987

Under consideration in this paper is a negotiating draft for a minerals regime. While this draft does not represent a final document, it does suggest the kinds of mechanisms which are under consideration for resolution of conflicting interests concerning sovereignty, conservation of the environment and third world access to resources. (Auth.)

M-36149

Heap, J.A., **Current and future problems arising from activities in the Antarctic,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.201-210.

DLC JX4084.A5 A556 1987

The question of future problems within the Antarctic Treaty system is considered, in the light of the preambular objective of the Antarctic Treaty that Antarctica should not become the 'scene or object of international discord'. It is argued that fears that the Antarctic Treaty Parties will be unable to deal with allegations of infringements of Treaty obligations (for example, of French plans to build an airstrip at Pointe Geologie) raise further doubts whether Parties can properly deal with prima-facie infringements of rules established within a future minerals regime. However, a more rigorous inspection system and the development of the political will to favor long-term interests above short-term advantages can overcome these problems. The paper considers the specific difficulties raised by fishing, minerals exploitation and decision-making (which rests upon the lowest common denominator) and claims to territorial sovereignty. It is concluded that effective management of resources and the environment can be achieved if states assert their claims to territorial jurisdiction rather than through any form of internationalization. (Auth.)

M-36150

Zain-Azraai, D., **Antarctica: the claims of 'expertise' versus 'interest',** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.211-217.

DLC JX4084.A5 A556 1987

It is argued that Antarctica is, or should become, the common heritage of mankind. The paper criticizes the assumption that a right to regulate antarctic resources can be founded on prior experience. Rather, the justifiable interests of the international community in antarctic management provide an appropriate basis for assuming a right to regulate resource exploitation in Antarctica in the future. It is recommended that a United Nations Ad Hoc Committee be formed to consider future regulation of antarctic resources on the ground that to do so provides the best chance of reconciling all legitimate interests. (Auth.)

M-36151
Rowland, J.R., **Whither Antarctica? Alternative strategies,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.218-226.

DLC JX4084.A5 A556 1987

The opposing views of the two preceding papers (M-36149 and M-36150) are examined in this paper which assesses alternative strategies for antarctic regulation. Proposed reforms within the Treaty system itself are considered along with more radical suggestions for a United Nations Trusteeship for a new international regime negotiated under the auspices of the United Nations and which has a genuinely universal character, and for separate regulation of minerals exploitation by a new international body representing all special interests. It is observed that the United Nations General Assembly may well endorse the central articles of the Antarctic Treaty and possibly also Article IV. Nonetheless, risks of instability are posed by negotiations for a minerals regime. The favored action is a moratorium on exploitation and the declaration of Antarctica as a world conservation area subject to United Nations endorsement. This, it is believed, is a practical means of avoiding conflicts between advocates of a common heritage, conservationists, and Antarctic Treaty Parties. (Auth.)

M-36152
Triggs, G.D., **United Nations in Antarctica? A watching brief,** Antarctic Treaty regime: law, environment and resources, edited by G.D. Triggs, Cambridge, Cambridge University Press, 1987, p.229-233.

DLC JX4084.A5 A556 1987

A summary is presented of the legal, environmental and political issues confronting the Antarctic Treaty parties, and those aspects of the Antarctic Treaty regime which require change or modification are identified. A summary is also given of the views of non-Treaty states which were submitted to the Secretary-General and included in his report to the United Nations in 1984. Consideration is given to the procedural options open to the General Assembly when it reviews the 'Question of Antarctica' on the agenda in 1986. While it seems unlikely that any Antarctic committee will be established under the auspices of the United Nations, the General Assembly may adopt a 'watching brief' over activities within the Antarctic Treaty regime by retaining the issue on the agenda. (Auth.)

M-36377
Schmied, J., **Antarctica in the international system: challenges of the 1990s** [La Antártida en el sistema internacional: Los desafíos de la década del 1990], Actas del segundo Symposium Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 2nd, Madrid, July 13-15, 1987. Proceedings.) Edited by J. Castellví, Madrid, Consejo Superior de Investigaciones Científicas, 1987, p.239-250, In Spanish with English summary.

After a short description of the Antarctic Treaty, the following is discussed: the debate between the supporters of the common-heritage-of-all-mankind formula in relation to the legal status of the antarctic continent and the members of the Antarctic Treaty; the problems that could arise from the legal status of Antarctica in relation to the type of organization, vote procedures and financial participation if the common-heritage-of-all-mankind formula were adopted; and the problems that the future exploitation of antarctic mineral resources will pose for both members and non-members, of the Antarctic Treaty. (Auth.)

M-36395
Mericq, L.S., **Antarctica: Chile's claim,** Washington, D.C., National Defense University Press, 1987, 125p.

The history of major antarctic explorations and discoveries is reviewed, and the diverse physical characteristics of the continent are described. The pressures, environmental and political, that threaten the future development of Antarctica are analyzed, and a critical examination of the Antarctic Treaty, with its full text appended, is presented. In conclusion, a case is made for antarctic claims of Chile, with a description of the geographical aspects of the Chilean Antarctic Territory, historical and juridical data on Chile's interests in Antarctica, Chile's presence in Antarctica, and a number of supporting figures, maps, photographs, tables and illustrations.

M-36479
Ramacciotti de Cubas, B., **Peru and the antarctic question** [El Perú y la cuestión Antártica], Lima, Centro Peruano de Estudios Internacionales, 1986, 76p., In Spanish. Refs. p.74-76.

After a brief review of antarctic geography, the economic and strategic value of the antarctic continent to the international community, the various bases for jurisdiction asserted by nations claiming sovereignty in Antarctica, the position of non-claimant countries, the Antarctic Treaty System, and the growing complexities of the antarctic issues in an international context, the focus is shifted to the principal factors to be considered for an adequate protection of Peruvian interests in Antarctica. This includes a discussion of the official position and scientific activities involving Peru with Antarctica between 1979 and 1983, an analysis of the 3 currents of thought regarding the type of involvement Peru should exercise in the future, and recommendations that Peru adopt an antarctic policy based on the changes occurring in the international scene currently and in the crucial next 5 years.

M-36482
Child, J., **Antarctica: issues and options,** *Marine policy reports,* Sep. 1987 10(1), p.1-5.

After a review of antarctic geography and history, the validity of national claims to Antarctica by various nations, the Antarctic Treaty, and the Antarctic Treaty System (ATS), an analysis is made of the issues that pose a threat to the survival of the latter. These include: the sovereignty issue, the antarctic resource exploitation, the environmental issues, the strategic and geopolitical issues, and the issue of 1991. Various options and approaches—retaining the *status quo,* expanding the ATS, internationalization, world park—are examined, with a discussion of the controversial Quadrant Condominiums theory and the concept of South American Antarctica for the Latin Americans. It is concluded that the most likely rational prospect for Antarctica is the one in which an expanded ATS undercuts the Third World internationalizing thrust and establishes an effective minerals regime, with environmental safeguards, as protection against the political and ecological dangers associated with a major find of an exploitable resource.

M-36489
Beck, P.J., **United Nations and Antarctica,** *Polar record,* Sep. 1987 23(147), p.683-690, 19 refs.

In Nov. 1986 the United Nations considered again the 'Question of Antarctica' and published a further study, up-dating and developing that produced in 1984 and guiding UN First Committee discussions of 18-19 Nov. 1986. Three resolutions were adopted concerning availability of information to the UN on Antarctica, a moratorium on the antarctic minerals regime negotiations, and the exclusion of South Africa as a Consulative Party. Most Antarctic Treaty parties did not vote; the consensus that characterized UN debates on Antarctica in 1983 and 1984 has yet to be restored. The 1986 session suggested more questions rather than providing answers; a key question is whether the Antarctic Treaty System will preserve its unity in view of the problem of continuing South African membership. (Auth.)

M-36544
Lynk, M.A., **Geopolitical implications of antarctic mineral resource development,** *U.S. Air Command and Staff College. Student report,* Apr. 1984 No.84-1625, 70p., 74 refs.

The report presents a current review of open sources on the issue of exploration and speculated exploitation of antarctic mineral resources with analysis of resultant geopolitical considerations. Brief overview of antarctic history, physical characteristics, Treaty evolution and provisions, and marine life exploitation precedes discussion of on and off-shore mineral elements, extraction and environmental constraints. The report concludes with evaluation of Treaty regime's viability versus mineral resource development pressures, including the UN, Third World, and Law of the Sea Treaty, and enumerates concerns for US role in Antarctica. (Auth.)

M-36546
Handbook of the Antarctic Treaty System, Cambridge, Scott Polar Research Institute, Feb. 1987, var. p., Fifth edition.

This handbook reproduces material related to the complex of arrangements comprising the Antarctic Treaty System. The major part of the volume consists of the text of the Antarctic Treaty and the "measures ["Recommendations"] in furtherance of the principles and objectives of the Treaty" adopted at Antarctic Treaty Consultative Meetings (ATCMs) held since 1961, together with relevant extracts from the reports of those meetings. The recommendations and extracts from reports are grouped into sections derived from the list of topics contained in Article IX of the Treaty. Introductory notes precede many of these sections to indicate briefly the scope and intention of the arrangements recorded in each section. A consolidated text of the Agreed Measures for the Conservation of Antarctic Fauna and Flora is included in Section 2. Eleven annexes contain, mainly, the following: a consolidated table showing which of the Recommendations have become effective in accordance with Article IX of the Treaty; a list of spent measures, together with the texts of Recommendations of which account has been taken elsewhere; the text of the Convention for the Conservation of Antarctic Seals, London 1972; the text of the Convention for the Conservation of Antarctic Marine Living Resources, Canberra 1980; material on 3 meetings of experts on Antarctic Telecommunications; and 2 reports (1977 and 1979) on technological and environmental questions related to antarctic minerals.

M-36570
Vaucher, M.E., **Prospective maritime jurisdictions in the polar seas,** *Woods Hole Oceanographic Institution. Technical report,* Jan. 1983 WHOI-83-1, 1 sheet, 26 refs.

The map illustrates the possible extent of maritime jurisdictional claims in Antarctica assuming application of the provisions of the United Nations Convention on the Law of the Sea. All sector claims to Antarctica were placed in abeyance by the 1959 Antarctic Treaty. Also shown on the map are equidistance maritime boundaries, land political boundaries, negotiated maritime boundaries, 200 N.M. exclusive economic zone, high seas, antarctic ice shelves, and 500 and 2500 m isobath lines. (Auth. mod.)

M-36979
Beck, P.J., **Antarctic minerals regime negotiations,** *Polar record,* Jan. 1988 24(148), p.59-61, 12 refs.

The antarctic minerals regime negotiations have made considerable progress towards the ATCPs' goal of filling a perceived gap in the ATS regarding the management of mineral resource activities and, at the same time, of ensuring that this will be achieved in a responsible and orderly manner through a regime capable of withstanding the test of time. A number of problems, most notably those concerning sovereignty, have had to be, and indeed are still being, resolved through the consensus approach characteristic of the ATS. Further compromises and accommodations are required still, but it is evident that areas of difference have been narrowed and those of consensus increased, thereby enhancing prospects for the conclusion of a Mineral Resources Convention about mid-1988. In such circumstances, the 1986 UN resolution in favor of a moratorium on the minerals negotiations seems unlikely to be heeded, while the demand of environmental groups for a world park appears also to have been overtaken by the momentum of events. In the meantime, the minerals negotiations continue. (Auth.)

M-36993
Joyner, C.C., **Antarctic minerals negotiating process,** *American journal of international law,* Oct. 1987 81(4), p.888-905, 41 refs.

Since 1982, a select group of states has been engaged in a series of multilateral negotiations to fashion a regime governing the exploration and exploitation of minerals in the antarctic region. The chief purpose of this paper is to analyze the process by which this group of concerned states has pursued national priorities within the decision-making framework and context of the antarctic minerals negotiations. Section 2 examines briefly the background to the Antarctic Treaty system; in section 3 the domestic facets of the antarctic minerals negotiating process are described; the thrust of the study is found in section 4, which appraises the international dimension of the antarctic minerals negotiating process; section 5 contains a critique of the negotiations, and section 6 presents some conclusions about their contribution to the international law-making process. (Auth. mod.)

M-37105
Mitchell, B., **Undermining Antarctica,** *Technology review,* Feb./Mar. 1988 91(2), p.48-57.

Following a brief background survey of Antarctica—why it is important that Antarctica be viewed as a part of the world which affects all other parts, how it was discovered, and how it came into public notice—a critique of the Antarctic Treaty system is presented. The Treaty itself and its adjuncts, including the minerals regime agreement, which together make up the ATS are faulted for vagueness in establishing responsibilities and having weak or no enforcement provisions for violations. Science programs are regarded as being bargaining chips in antarctic politics. The point of view reflects a strong desire to protect the antarctic environment and a profound distrust of the ATS and all who participate in, negotiated, and now administer the System. In the case of the minerals regime agreement, an alternative to political controversies is offered in which the agreement would be altered to include strong, detailed regulations to protect the environment and to ease the qualms of nations not belonging to the ATS.

M-37265
Ramacciotti de Cubas, B., **Antarctica as a peace zone** [La Antártida como zona de paz], *Thémis,* 1988 No.10, p.42-45, In Spanish.

Peaceful uses of Antarctica, and its demilitarization and denuclearization in the light of the Antarctic Treaty principles, are discussed, and the Treaty is found to be a valuable mechanism in the international cooperation toward that end. The points establishing the importance of a peaceful Antarctica to Latin America in general, and to Peru in particular, are considered, with the conclusion that adoption of a territorial claim policy, or of the common heritage principle, is not a preferable alternative to the *status quo.*

M-37266
Child, J., **Antarctica and the southern ocean: Latin American interests,** *Third world affairs,* 1988 p.370-381, 37 refs.

The background of recent developments in Antarctica, the surrounding ocean, and the Antarctic Treaty System (ATS) is addressed, with emphasis on the Latin American nations and their maritime interests. This includes the sovereignty problems and claims, the strains on the ATS by the resource question, the time pressures of 1991, the pressure by non-members of the ATS, and the U.N. debates. Also reviewed are the controversial options for a South Atlantic security policy, the South Pacific security and ecological issues, and the question of South Africa's presence in the ATS. The most significant developments over the past years affecting change within the ATS are summarized.

M-37267

Lee, S.-H., **Third World approaches to Antarctica,** *Third world affairs,* 1988 p.382-391, 39 refs.

Some of the key interests that characterize contemporary Third World politics in Antarctica are examined, including the political-legal barriers to newcomers in the Antarctic Treaty regime, and the three major group categories—territorial claimants, *status quo* supporters, and revisionists—reflecting national policies pursued. It is concluded that in spite of these distinct and sometimes contradictory Third World approaches, their views and increasingly vocal claims for an equitable antarctic management system are likely to reshape the political context of the continent in the next decade.

M-37269

Joyner, C.C., **Evolving antarctic minerals regime,** *Ocean development and international law,* 1988 Vol.19, p.73-95, 116 refs. and notes.

The Antarctic Treaty Consultative Parties are completing negotiation on a minerals regime for the continent and its coastal waters. As determined from the most recent treaty text, 4 principal organs will comprise the regime: (1) the Special Meeting of All States, which will allow Non-Consultative Party members some voice in the regime; (2) the Antarctic Minerals Resources Commission, the executive agency for deciding whether or not to open an area in the Antarctic for mineral development; (3) Regulatory Committees for each area, responsible for overseeing any exploration and exploitation activities; and (4) a Scientific, Technical and Environmental Advisory Committee to draft assessments and make recommendations to the Commission on environmental consequences of developmental activities. The success of the antarctic minerals regime will turn on the ability of the ATCPs to accommodate their national interests with the international community and the regime's ability to preserve and protect the antarctic environment.

M-37290

Parsons, A., **Antarctica: the next decade,** Cambridge, University Press, 1987, 164p., Notes and refs. p.159-162. Report of a study group.

DLC JX4084.A5 A57

The future of Antarctica is the topic of this three part volume. The first three chapters address the value of the Antarctic Treaty, the argument for changes in it, and how it has an effect on and could better serve non-governmental organizations, conservation, and the environment. The next four chapters outline the current and potential uses the region has in the field of science, resources, conservation, mineralogy, as well as military strategy. Part three speculates on the future and its call for action. Four appendices, maps, references, and an index are included.

M-37383

Law, P., **Future policy for the Antarctic,** *Interdisciplinary science reviews,* Dec. 1985 10(4), p.336-348, 12 refs.

Before suggesting a realistic scientific, commercial and political future policy for the antarctic continent, the author reviews various eras of past antarctic activity. These were the Trading Era, followed by the Imperialistic Era and the Scientific Era, the advent of the IGY and SCAR, and the Antarctic Treaty. Full attention is given to the commercial resources of the Antarctic and their exploitation, which leads logically to the options available for the future. The 'Heritage of Man' concept is favored under supervision by the Treaty Nations. (Auth.)

See also:
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